SANDERS PROPERTY
TPM 20765

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EXECUTIVE SUMMARY

This Fire Protection Plan (FPP) has been prepared for APN's (410-010-07 & 410-030-20) Sanders Property. The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. The proposed project is located within the Pine Valley Fire Protection District. The Fire Protection Plan for the Sanders Property is subject to the review and approval of the Pine Valley Fire Protection District and the County of San Diego.

The proposed project is a minor subdivision and residential development of approximately 32.36 gross acres into four single-family homes, with lot sizes ranging from 7.13 to 9.44 acres. One private road is proposed within the project site. The project is located in east San Diego County within the community of Pine Valley. There is one access point to the property via Old Highway 80 to the proposed private road. Water will be provided by four 10,000 gallon water tanks dispersed one per parcel. An existing well will remain and three additional wells are proposed. Septic systems will be utilized for wastewater. The project is located within the Pine Valley Fire Protection District and a State Responsibility Area as mapped by the CalFire (formerly CDF).

The project is designed in conformance and meets or exceeds all applicable codes and standards. The project will not expose people or structures to a significant risk of loss, injury, or death as a result of wildland fires. The project will not have a substantial adverse impact to services including response time that would result in physical impacts with environmental effects. The project has adequate emergency access. The project will have sufficient water supplies available to serve the project from existing entitlements. As a result there are no significant impacts pursuant to CEQA.

1.0 INTRODUCTION

This Fire Protection Plan (FPP) has been prepared for the Sanders Property (TPM 20765). The proposed project is a minor subdivision and residential development of approximately 32.36 gross acres into four single-family parcels, with lot sizes ranging from 7.13 to 9.44 acres. The purpose of the FPP is to assess the potential impacts resulting from wildland fire hazards and identify the measures necessary to adequately mitigate those impacts. As part of the assessment, the plan has considered the property location, topography, geology, combustible vegetation (fuel types), climatic conditions, and fire history. The plan addresses water supply, access (including secondary/emergency access where applicable), structural ignitability and fire resistive building features, fire protection systems and equipment, impacts to existing emergency services, defensible space, and vegetation management. The plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect one or more-at-risk communities and essential infrastructures. The plan recommends measures that property owners will take to reduce the probability of ignition of structures throughout the area addressed by the plan.

The proposed project is located within the Pine Valley Fire Protection District. The Fire Protection Plan for the Sanders Property is subject to the review and approval of the Pine Valley Fire Protection District and the County of San Diego. The Fire Service Availability Letter is included as Appendix A.

1.1 Project Location, Description and Environmental Setting

1.1.1 Project Location

The proposed project is located within the community of Pine Valley within unincorporated San Diego County (Figure 1). The project is located off Old Highway 80 approximately 0.85 miles north of Interstate 8 (Figure 2). The project is located within the Pine Valley Fire Protection District and a State Responsibility Area as mapped by the CalFire (formerly CDF) (Figure 3). The project is not located within a water district.

1.1.2 Project Description

The proposed project is a minor subdivision and residential development of approximately 32.36 gross acres into four single-family homes, with lot sizes ranging from 7.13 to 9.44 acres (Figure 4). One private road is proposed within the project site. The project is located in east San Diego County within the community of Pine Valley. There is one access road to the property from Old Highway 80. The water will be supplied by wells and storage tanks. One existing well will remain and three additional wells are proposed. Septic systems will be utilized for wastewater. The project is located within the Pine Valley Fire Protection District and a State Responsibility Area as mapped by the CalFire (formerly CDF).

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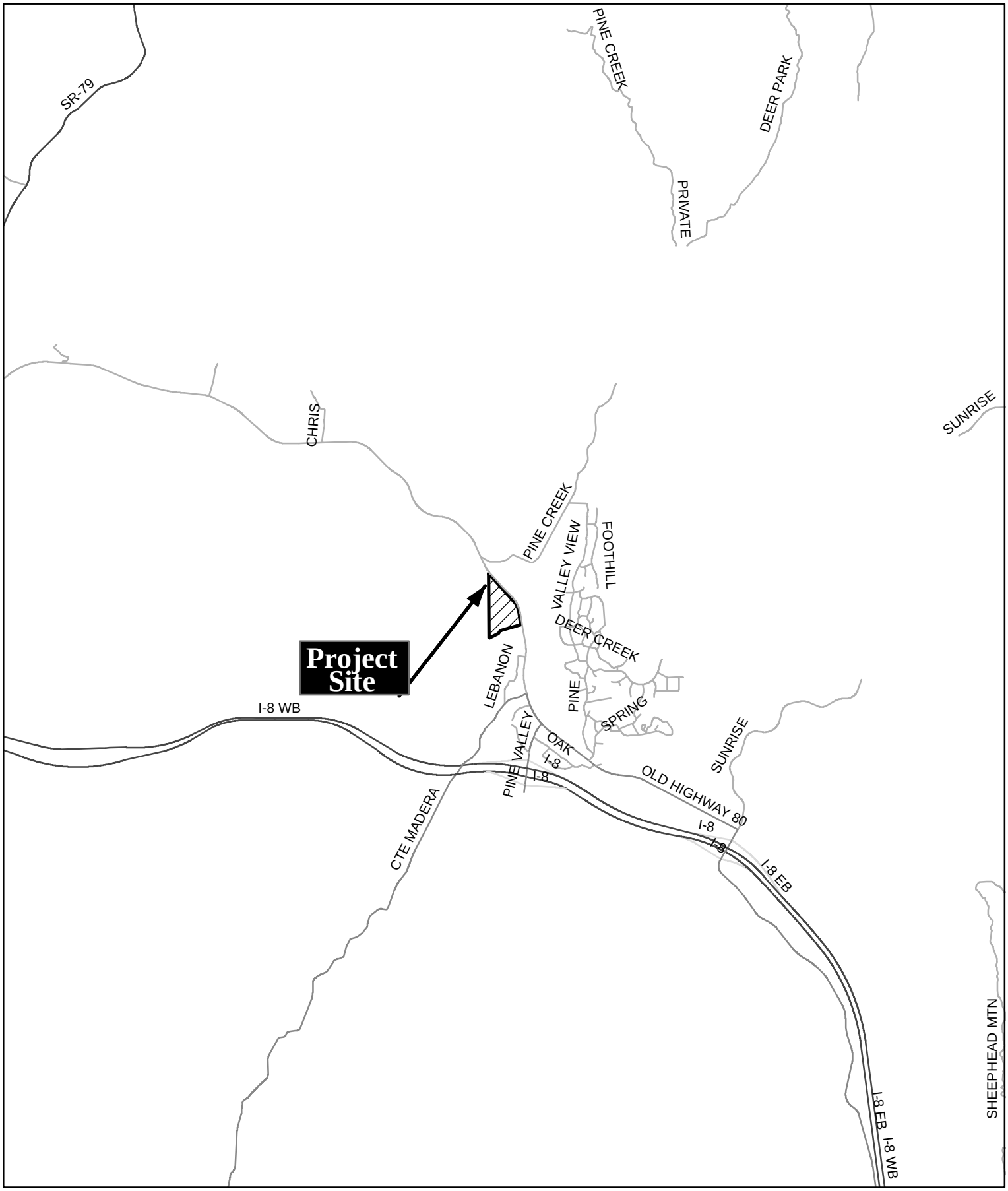
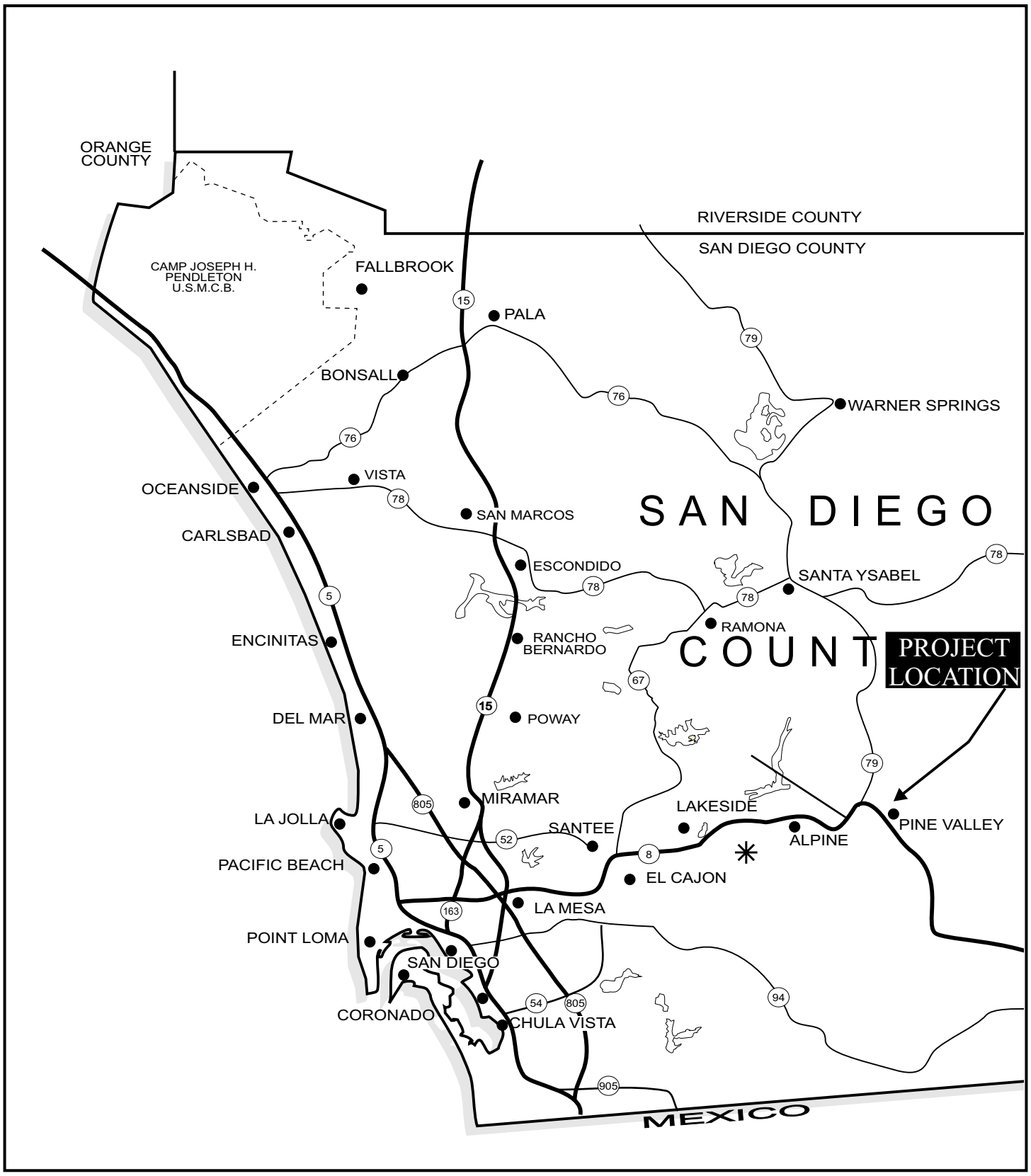


RC
Biological Consulting, Inc.

Figure 2
Vicinity Map
TPM 20765

0 0.25 0.5 1
Miles



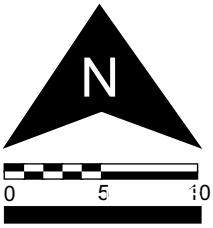
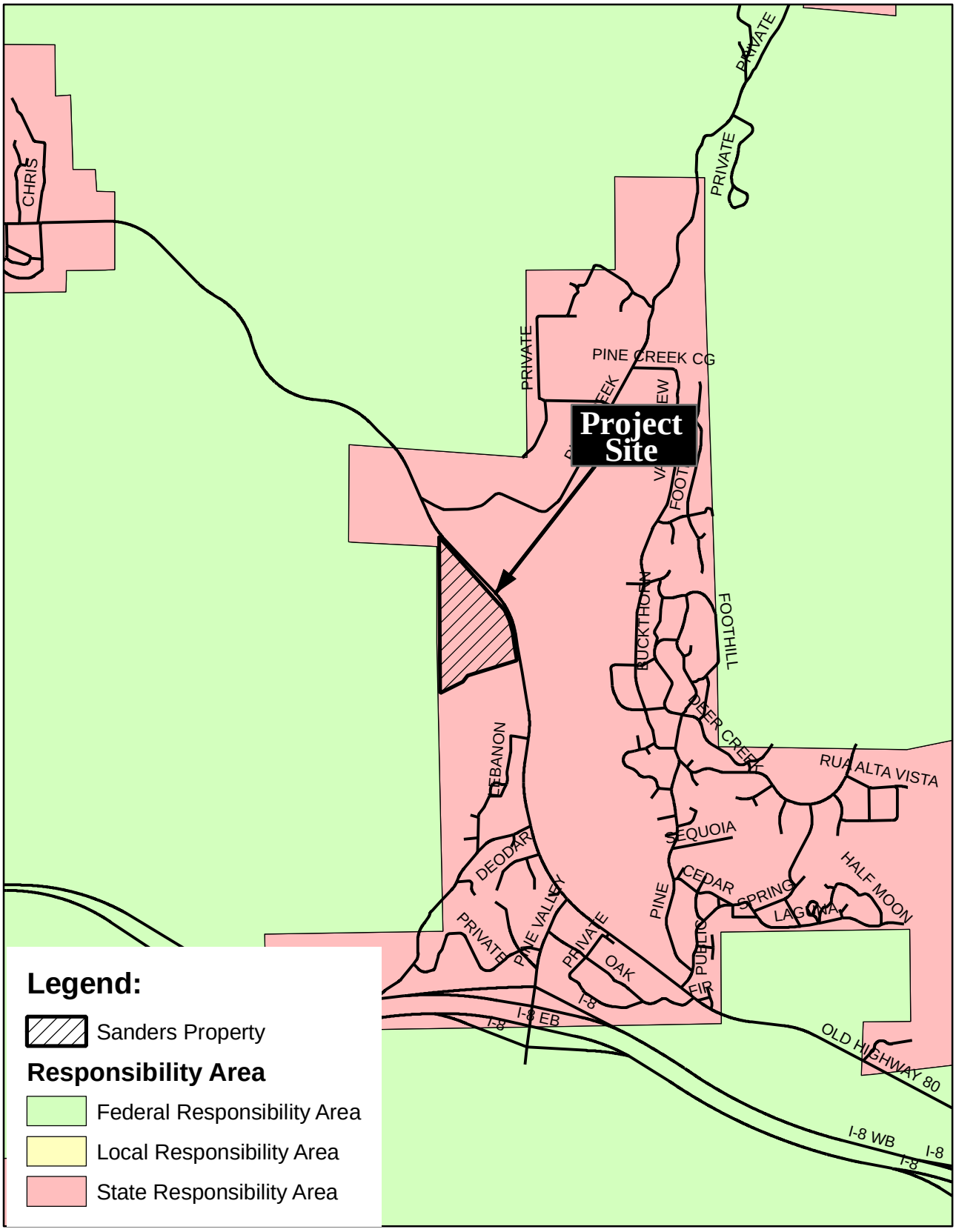


Figure 1
Regional Location Map



Source: http://frap.cdf.ca.gov/

Figure 3
Responsibility Area Map
Sanders Property

N

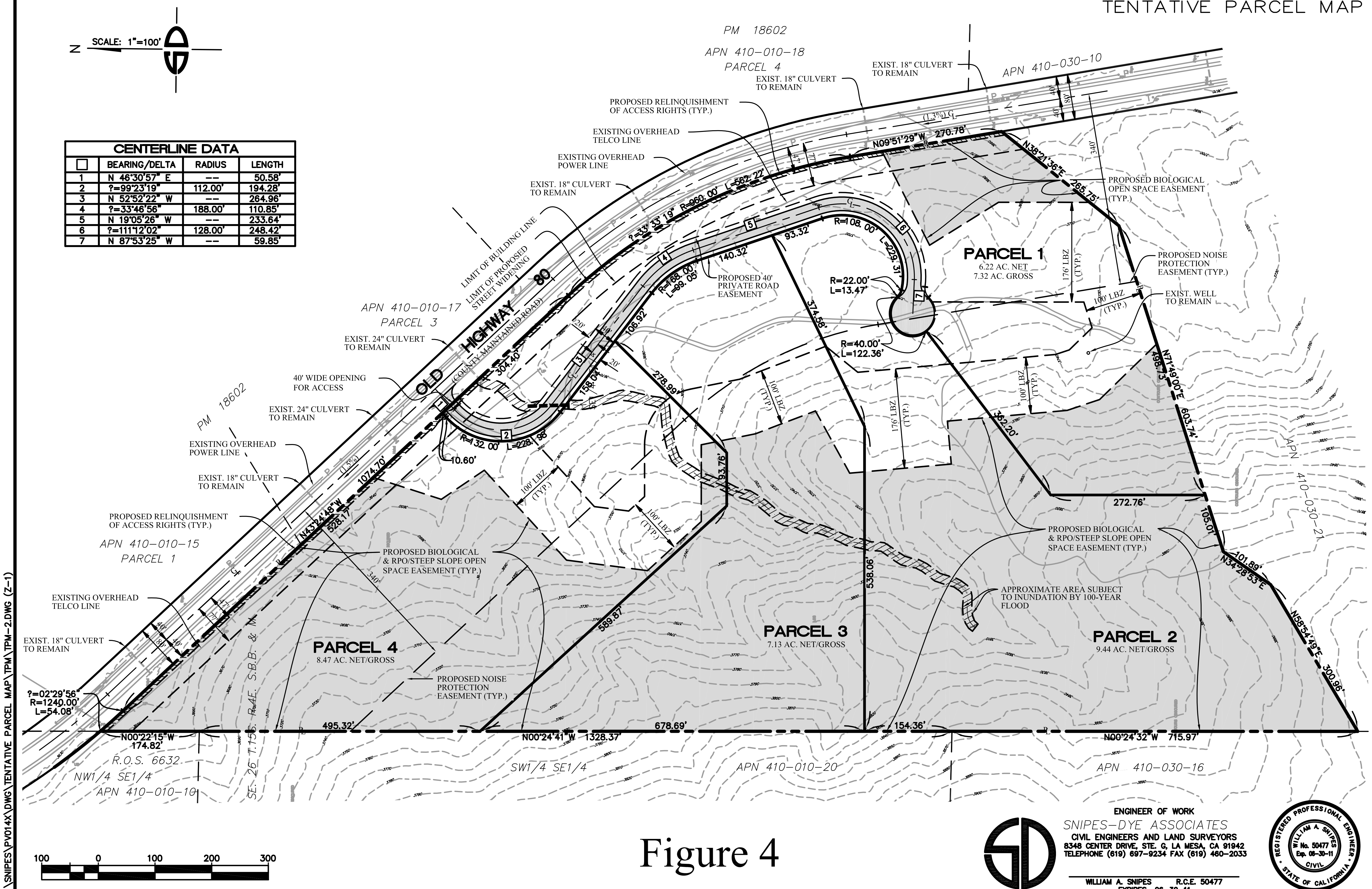
Feet

0 1,500 3,000

VPM059

SHEET 2 OF 2 SHEETS

TENTATIVE PARCEL MAP



SCALE: 1"=100'
N
PM 18602
APN 410-010-18
PARCEL 4
APN 410-030-10
APN 410-010-17
PARCEL 3
APN 410-010-15
PARCEL 1
OLD HIGHWAY 80
(COUNTY MAINTAINED ROAD)
LIMIT OF BUILDING LINE
LIMIT OF PROPOSED STREET WIDENING
EXIST. 18" CULVERT TO REMAIN
EXIST. 24" CULVERT TO REMAIN
40' WIDE OPENING FOR ACCESS
EXISTING OVERHEAD POWER LINE
EXISTING OVERHEAD TELCO LINE
PROPOSED RELINQUISHMENT OF ACCESS RIGHTS (TYP.)
PROPOSED 40' PRIVATE ROAD EASEMENT
PROPOSED BIOLOGICAL OPEN SPACE EASEMENT (TYP.)
PROPOSED BIOLOGICAL & RPO/STEEP SLOPE OPEN SPACE EASEMENT (TYP.)
PROPOSED NOISE PROTECTION EASEMENT (TYP.)
EXIST. WELL TO REMAIN
APPROXIMATE AREA SUBJECT TO INUNDATION BY 100-YEAR FLOOD
PARCEL 1
6.22 AC. NET
7.32 AC. GROSS
PARCEL 2
9.44 AC. NET/GROSS
PARCEL 3
7.13 AC. NET/GROSS
PARCEL 4
8.47 AC. NET/GROSS
176' LBZ (TYP.)
100' LBZ (TYP.)
N09°51'29"W 270.78'
N38°21'36"E 265.75'
N71°49'00"E 498.73' 603.74'
105.01'
N34°28'53"E 101.89'
N58°54'49"E 300.96'
N00°24'32"W 715.97'
154.36'
538.06'
N00°24'41"W 1328.37'
678.69'
495.32'
N00°22'15"W 174.82'
N43°24'48"W 528.17' 1074.70'
?=02°29'56"
R=1240.00'
L=54.08'
?=33°33'19" R=960.00' L=562.22'
R=132.00' L=228.98'
R=168.00' L=99.05'
R=108.00' L=229.31'
R=22.00' L=13.47'
R=40.00' L=122.36'
10.60'
304.40'
158.04'
106.92'
140.32'
93.32'
374.58'
278.99'
93.76'
589.87'
362.20'
272.76'
340'
40' 40' 80'
(1.3%)
(1.5%)
SE. 26 T.15S. R.4E. S.B.B. & M.
R.O.S. 6632
NW1/4 SE1/4
APN 410-010-10
SW1/4 SE1/4
APN 410-010-20
APN 410-030-16
APN 410-030-21
100 0 100 200 300

CENTERLINE DATA

☐	BEARING/DELTA	RADIUS	LENGTH
1	N 46°30'57" E	--	50.58'
2	?=99°23'19"	112.00'	194.28'
3	N 52°52'22" W	--	264.96'
4	?=33°46'56"	188.00'	110.85'
5	N 19°05'26" W	--	233.64'
6	?=111°12'02"	128.00'	248.42'
7	N 87°53'25" W	--	59.85'

Figure 4

ENGINEER OF WORK
SNIPES-DYE ASSOCIATES
CIVIL ENGINEERS AND LAND SURVEYORS
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WILLIAM A. SNIPES R.C.E. 50477
EXPIRES 06-30-11

REGISTERED PROFESSIONAL ENGINEER · WILLIAM A. SNIPES · No. 50477 · Exp. 06-30-11 · CIVIL · STATE OF CALIFORNIA

S:\SNIPES\PV014X\DWG\TENTATIVE PARCEL MAP\TPM\TPM-2.DWG (Z-1)

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TPM 20765 RPL-2
LOG NO. 03-15-006

1.1.3 Environmental Setting

Land Use, Topography, Climate

The project site was visited to review the topography, vegetation and existing uses of the property. The project site is undeveloped. The property is immediately bordered by Old Highway 80 on the northern and eastern property boundaries. Beyond the highway on the northern boundary is undeveloped land along with rural residential development. Beyond the highway on the eastern boundary is a combination of agriculture/grasslands and big sagebrush scrub along with rural residential development; to the south is undeveloped land and rural residential development, and the entire western boundary is bordered by undeveloped land (Figure 5).

The project area, approximately 32.36 gross acres, has a mixture of moderate to steep terrain (Figure 6). Elevations onsite range from 3600 feet to 3890 feet above mean sea level (MSL).

The County is divided into five climate zones from the coast to the desert (Climates of San Diego County, Agricultural Relationships, University of California, Agricultural Extension Service, and U.S. Weather Bureau). These climate zones are determined by several factors: proximity to the ocean, terrain, elevation, and latitude. Using the Koppen system, the metropolitan areas of Southern California have a Mediterranean climate, characterized by mild, sometimes wet winters and warm, very dry summers. The Mediterranean climate includes all coastal areas, valleys and foothills. Annual precipitation amounts increase gradually from the coast to the mountain crests, then drop dramatically into the deserts. Most precipitation comes from winter storms between November and March. The site is located within the interior climate zone. Average rainfall is 22 inches per year (Western Regional Climate Center).

Vegetation, Fuel Loads, Fire History

The existing vegetation was mapped by Tierra Environmental Services (Figure 7). A moderate percentage of the project site is proposed to be impacted. The fuel threat will be primarily from the vegetation offsite and open space easements dispersed within the property. This vegetation is composed of big sagebrush scrub, southern mixed chaparral, interior live oak woodlands and agriculture/grasslands. The photographs below illustrate the vegetation and habitats within and surrounding the property.

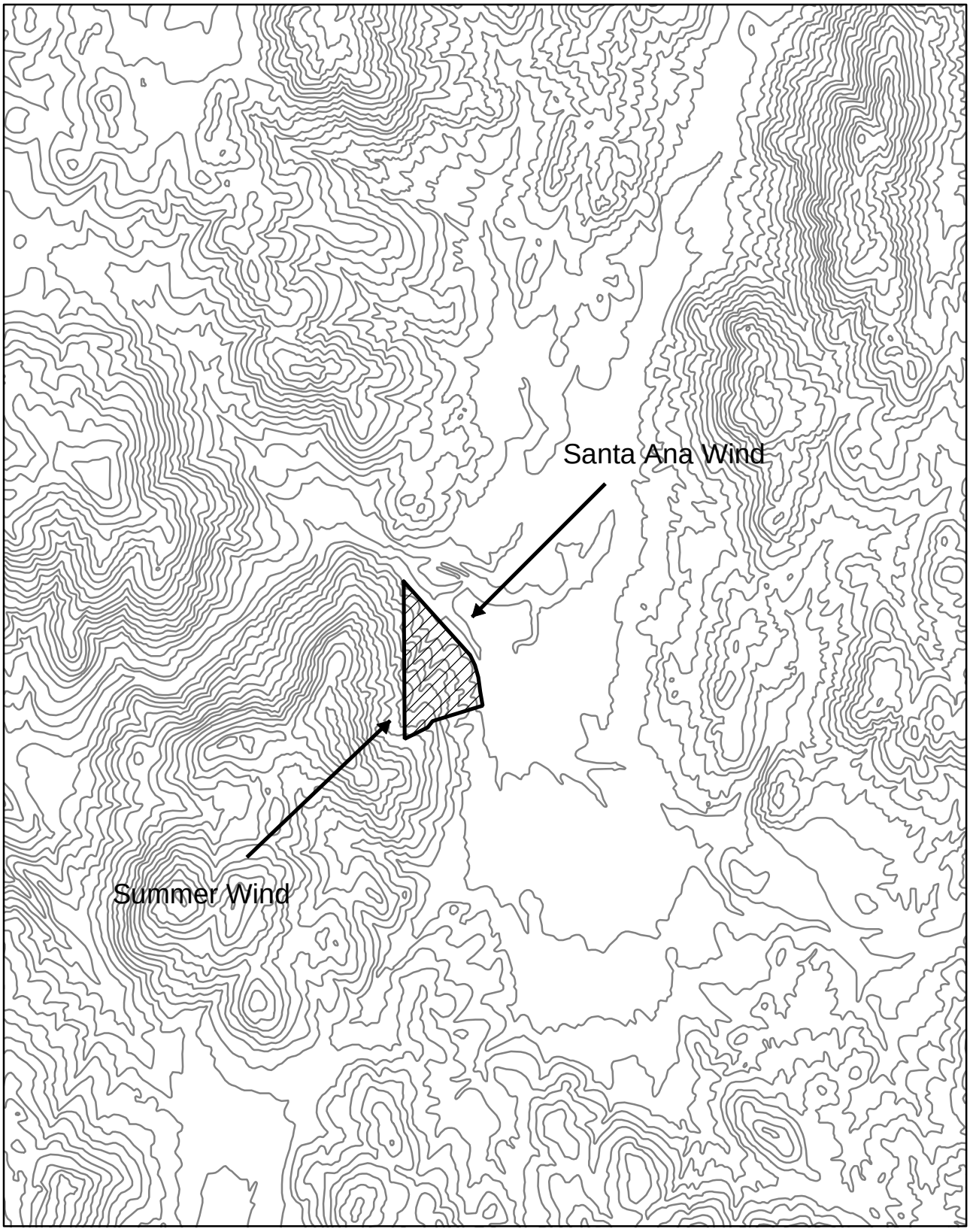
The project site is mapped as being located within an area of high and very high fuel threat as identified by CalFire (Figure 8). The fire history of the site and surrounding area (approximately 12 mile radius) was reviewed (Figure 9). The source of the fire history information is CalFire and San Diego Geographic Information Source (SanGIS) Data Warehouse from July 2008. The assessment includes most fires greater than 10 acres in size, however not all historic fires may be documented. A total of 11 documented fires have burned in the project site area between the years 1910 and 2007, with at least one fire occurring per decade. To date, the most recent large fires in the area were the Harris Fire in 2007 which burned approximately 12 miles southwest of the project site and the Cedar Fire in 2003 which burned approximately 6 miles northeast of the project site. Other historic fires that burned vast amounts of land near the project site are the Laguna Fire in 1970 and the Conejos Fire in 1950. Pine Valley has and maintains many community fire breaks and prescribed burn areas surrounding the community.

Source: TerraServer Image: 1/1/2008

Figure 5
Aerial Image
Sanders Property
APN's 410-010-01 & 410-030-20

N

0 200 400 600 Feet



Source: USGS 7.5' Descanso Quadrangle

Figure 6
Contour Map
Sanders Property

N

0 1,500 3,000 Feet

LEGEND

VEGETATION

COMMON NAME	ABBREVIATION	AREA
– INTERIOR LIVE OAK WOODLAND (71150)	ILOW	12.66 AC.
– SOUTHERN MIXED CHAPARRAL (37120)	SMC	17.66 AC.
– BIG SAGEBRUSH SCRUB (35120)	BSS	1.59 AC.
– DISTURBED SOUTHERN MIXED CHAPARRAL (37120)	DSMC	N/A
– SOUTHERN WILLOW SCRUB (63320)	SWS	N/A
– ROCK OUTCROP	RO	N/A
– EXISTING DISTURBED AREA		0.45 AC.
		32.36 AC= TOTAL

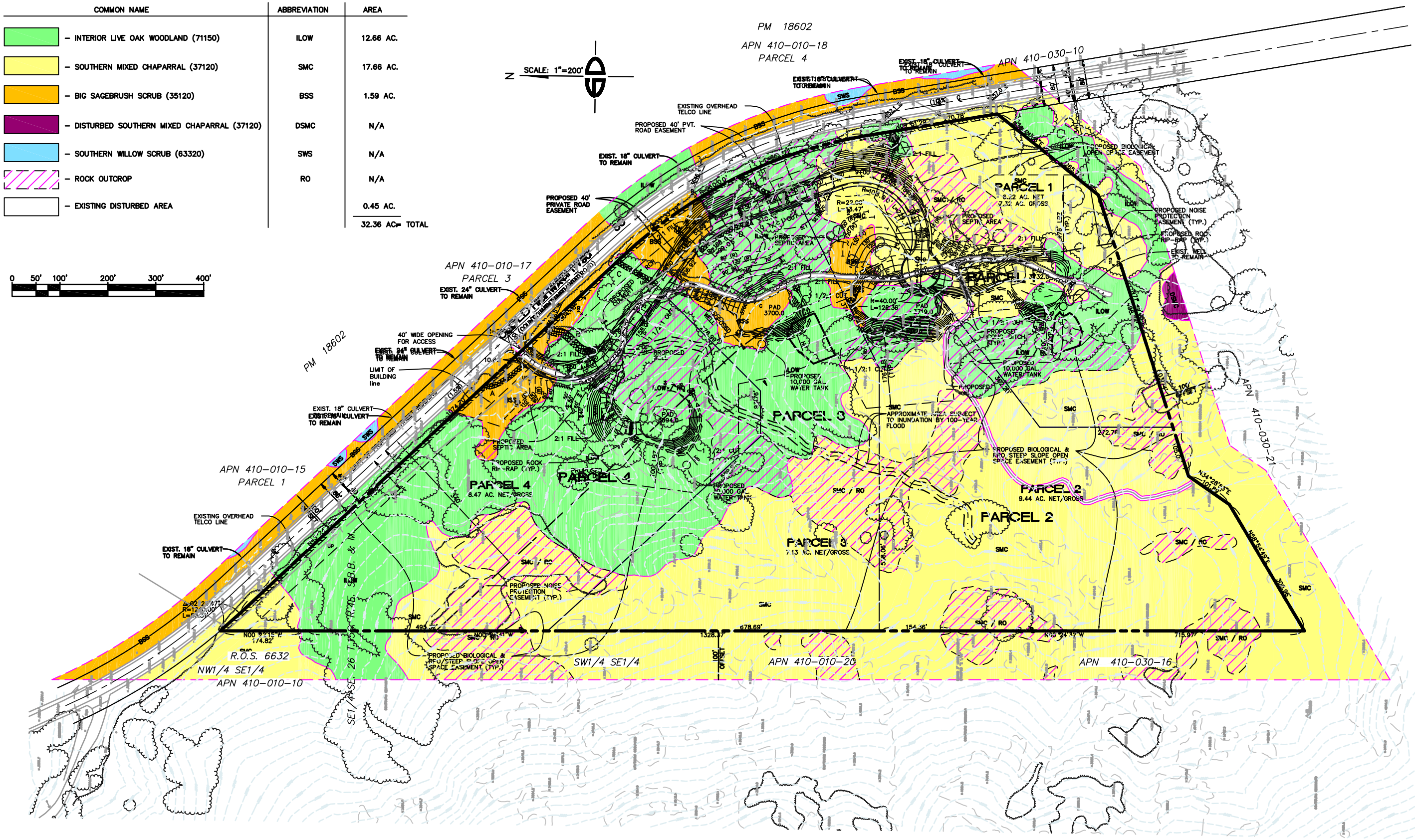


Figure 7 - PINE VALLEY TPM 20765 RPL-2

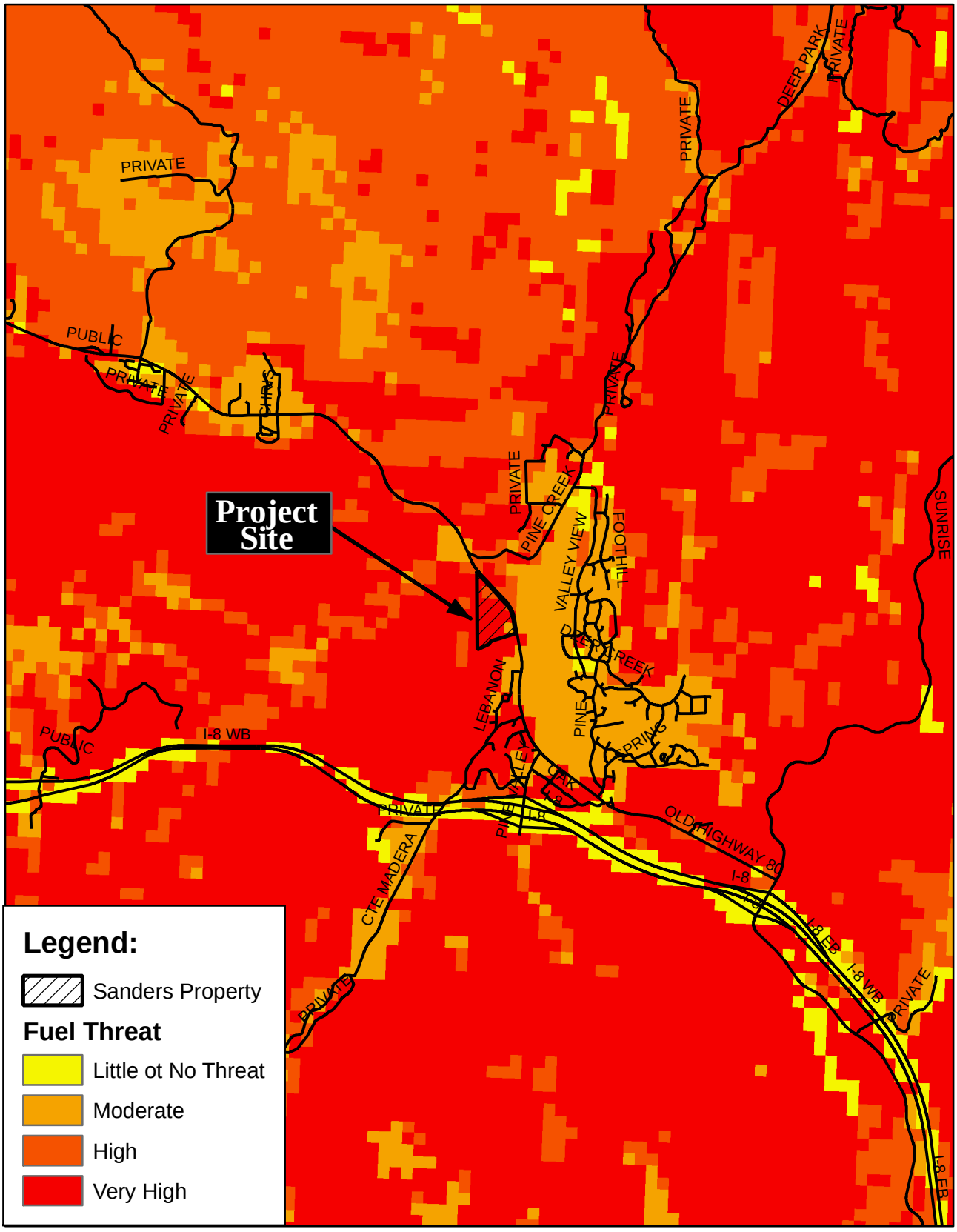


Figure 8
Fire Threat
Sanders Property

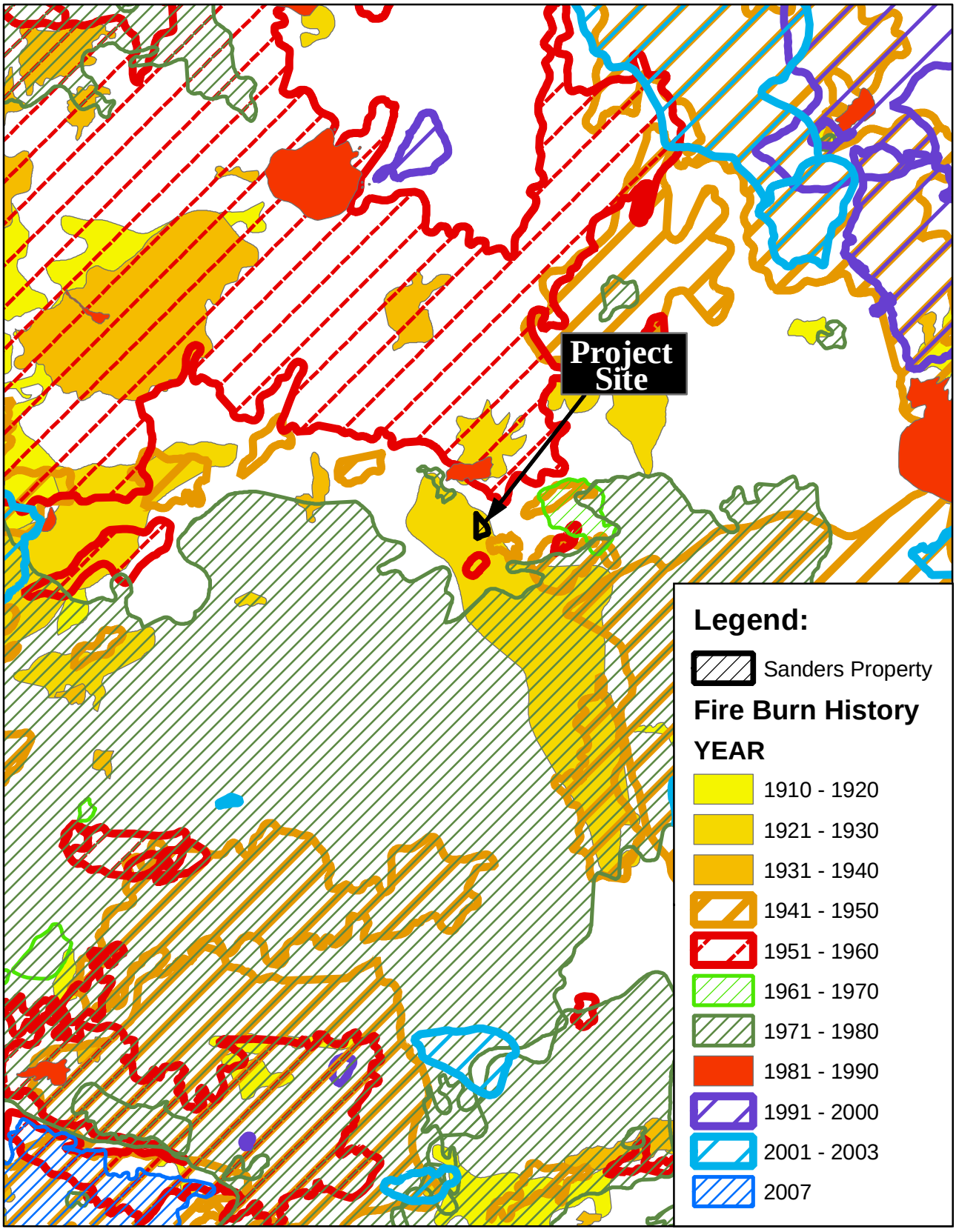
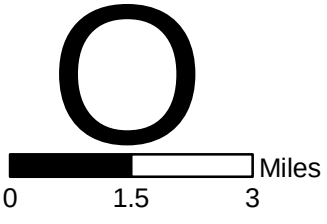


Figure 9
Fire History
Sanders Property



Photograph 1. Interior Live Oak Woodland mixed with pine and Big Sagebrush Scrub (Looking WSW from proposed private road entrance at Old Highway 80).

Photograph 2. Southern Mixed Chaparral & Interior Live Oak Woodland. Grasslands present offsite in the distance. (Looking east from proposed private road).

Photograph 3. Southern Mixed Chaparral. (Looking northwest from proposed private road).

Photograph 4. Grasslands offsite in the distance. (Looking ENE from proposed private road).

Photograph 5. 12”x 9” clipboard at base of Redshank for scale of surrounding habitat.

2.0 ANALYSIS OF PROJECT EFFECTS

2.1 Adequate Emergency Services

The project is located within the jurisdiction of the Pine Valley Fire Protection District. The District has provided a Fire Service Availability letter stating that there are adequate services for this project (Appendix A). The nearest fire station is located at 28850 Old Hwy 80, Pine Valley. The fire station is located approximately one mile south from the project site. The estimated travel time from the Fire Service Availability Letter is 2 minutes. The travel time is in compliance with the Public Facilities Element of the San Diego County General Plan (County 1979).

2.2 Primary and Secondary Access

Access will be provided by one access point to the property. The project will have access from the east by Old Highway 80, a public road in which one may travel a short distance south to bisect Interstate 8 or head northwest and connect with Highway 79 providing additional routes in the event of evacuation (Figure 2).

The private road is proposed to be paved and 24 feet in width as can be seen on Figure 4. This width must also have unobstructed vertical clearance of no less than 13 feet 6 inches. The road has been designed in conformance with grade, surface and other design requirements such as fire truck turnarounds.

Two parcels, proposed parcel 1, and proposed parcel 4 (the northern-most and southern-most) have driveways that extend beyond 150 feet. All dead-end access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of emergency apparatus.

Old Highway 80 provides the ability to exit in two directions. The proposed cumulative dead end length of the proposed cul de sac and driveway is approximately 1160 feet. The project is in conformance with the allowable dead end length of 1320 feet in conformance with Title 14. Secondary access is not required.

2.3 Water

The project site is not located within a Water District. One existing well will remain onsite as three additional wells are proposed. Water shall be supplied by a 10,000 gallon tank on each parcel to the satisfaction of the Fire Marshal prior to issuance of a building permit. Water storage tanks shall be in conformance with Section 508.2 of the County Fire Code 2008 (County of San Diego 2008). Tank elevation shall be equal to or higher than the fire department connection on the premises. Regardless of domestic use the tank shall be equipped with a device that will ensure that the tank contains 10,000 gallons of water. The tank shall be capable of supplying a minimum fire flow of 250 gallons per minute for the duration of 40 minutes. Supply outlet shall be at least 4 inches in diameter from the base of the tank to the point of inlet at the hydrant. The fire department connection on the tank shall be at least one 4-inch National Standard Thread (male), reduced to one 2 ½-inch National Standard (male). Additional outlets maybe required. The outlet shall be located along an access roadway and shall not be closer than 50 feet, nor further than 150 feet from the structure. All exposed tank pipes shall be of an alloy or other material listed for above ground use. Adequate support shall be provided. Water storage tanks shall be constructed from materials approved by the Pine Valley Fire Protection District and installed per manufacturer recommendations.

2.4 Ignition Resistant Construction and Fire Protection Systems

The Sanders Project will be required to utilize enhanced fire resistive construction. Building construction requirements are specified in Chapter 7a of the County of San Diego Building Code. Construction shall meet or exceed these requirements. The project shall install life safety

sprinklers in conformance with the requirements of the District and the County Building Code.

2.5 Defensible Space and Vegetation Management

2.5.1 Vegetation

As discussed in Section 1.1.3 the surrounding vegetation is composed largely of big sagebrush scrub, southern mixed chaparral, interior live oak and agriculture/grasslands. The photographs in the same section illustrate the fuel loading of this habitat.

2.5.2 Fuel Modeling

Several factors were taken into consideration when determining the fuel management zones including topography, degree of exposure, parcel size, and proximity to biological open space. Fire modeling was performed using Behave Plus 3.0.2 for three types of weather conditions, a Santa Ana weather condition, a peak weather condition and a summer weather condition. Weather data for the Santa Ana, peak and summer conditions were determined by the Standard Weather Parameters for the Interior Zone from the County of San Diego Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection (County 2007). Table 1, identifies the weather inputs for each of the conditions: Santa Ana, peak and summer.

Table 1
Weather Inputs for the Interior Zone

Period	Temperature (Fahrenheit)	Relative Humidity	Sustained Wind Speed (mph)
Santa Ana	109°	5-9%	24
Peak	109°	5-9%	56
Summer	109°	10-14%	18

Modeling was performed for southern mixed chaparral, big sagebrush scrub, interior live oak woodlands and non-native grasslands (which also represents agriculture lands) found within and adjacent to the proposed development. Table 2 identifies the habitats and fuel models used to represent the habitat.

Table 2
Habitats and Fuel Models

Habitat	Fuel Model	Description*
Dry Climate Grasslands/ Agriculture land	GR4	The primary carrier of fire in this model is continuous, dry-climate grasses. The typical depth is two feet. This is a conservative model of for non-native grassland and agriculture land present offsite and to the east. This model allows that the grasslands may not always be mown.
Very High Load, Dry Climate Timber-Scrub	TU5	The primary carrier of fire in this model is dry climate timber-shrub. The typical

Table 2 Habitats and Fuel Models		
Habitat	**Fuel Model**	**Description***
		depth is one foot. This is an appropriate model for the Interior live oak woodland onsite.
Moderate load, dry climate shrub	SH1	The primary carrier of fire in this model is woody shrubs and shrub litter. Low shrub fuel load, fuelbed depth about 1 foot; some grass may be present. Spread rate is very low; flame length is very low. This is an appropriate model for the big sagebrush scrub located both onsite and offsite.
Chaparral	4	The primary carrier of fire in this fuel model is woody shrubs and shrub litter. The typical depth is 6 feet. This is an appropriate model for the mature southern mixed chaparral which typically has very little herbaceous composition and has leaf litter.

* The complete model parameters are included as Appendix C.

The full results of the modeling are included in Appendix D and summarized below for each weather period.

2.5.2.1 Santa Ana Condition

A Santa Ana weather condition is potentially the worst weather for fire. Santa Ana's typically occur from September to May. The fall Santa Ana can create extremely dangerous fire conditions because they are associated with high temperatures, high winds coming from the north/northeast and low humidity. They also occur after long periods of no rain when the vegetation is in a drought stress condition. The soft shrubs that compose habitats such as coastal sage scrub are semi-drought deciduous and have typically lost the majority of their foliage by the end of summer.

Fire Behavior

Santa Ana winds result in a wind driven fire. These winds typically come from the northeast. Santa Ana winds are Foehn winds which are warm dry winds that result from air spilling over high elevations and moving downhill. These are gravity winds that typically follow the ground. When gravity winds hit an obstacle they can either split around the obstacle and continue or follow the object to the top and then launch over the top resulting in an area behind the obstacle with normal wind conditions.

Multiple fire breaks and prescribed burn areas are located within and adjacent to the community of Pine Valley. The existing fuel breaks combined with these areas of prescribed burns may slow a fire during Santa Ana fire conditions.

Fire Modeling

Modeling was performed using the Santa Ana weather conditions identified in Table 1 and the fuel models identified in Table 2. The model conservatively indicates the largest numbers and is presented in Table 3.

Table 3 Results for a Santa Ana Fire				
	Southern Mixed Chaparral	**Non-Native Grasslands**	**Coast Live Oak Woodland**	**Big Sagebrush Scrub**
Flame Length	51’	20’	16’	7’
Rate of Spread	489 ch/h	361 ch/h	40 ch/h	58.2 ch/h

2.5.2.2 Peak Conditions

Peak conditions are the extreme conditions during a Santa Ana event. The peak winds represent the gusts that occur during a Santa Ana.

Fire Behavior

The fire behavior would be essentially the same as during a Santa Ana, however the gusts could significantly increase the rate of spread and the distance that fire brands travel during the time that they are occurring.

Fire Modeling

Modeling was performed using the peak weather conditions identified in Table 1 and the fuel models identified in Table 2. The model conservatively indicates the largest numbers and is presented in Table 4.

Table 4 Results for Peak Conditions				
	Southern Mixed Chaparral	**Non-native Grasslands**	**Coast Live Oak Woodland**	**Big Sagebrush Scrub**
Flame Length	88’	33’	25’	9’
Rate of Spread	1,575 ch/h	1,122 ch/h	103 ch/h	98.3 ch/h

2.5.2.3 Normal Weather Condition

Normal weather conditions consist of an onshore flow from the southwest. This condition has a lower temperature and higher humidity than does a Santa Ana condition.

Fire Behavior

A fire under normal conditions is typically a fuel driven fire, however wind will also contribute to the rate of spread. Directly south, the property is adjacent to rural development which may

slow the fire before reaching the project site; however, the southwestern portion of the property abuts an expanse of undeveloped land (Figure 5).

Fire Modeling

Modeling was performed using the summer weather conditions identified in Table 1 and the fuel model identified in Table 2. The model conservatively indicates the largest numbers and is presented in Table 5.

Table 5
Results for Summer Conditions

	Southern Mixed Chaparral	Non-native Grasslands	Coast Live Oak Woodland	Big Sagebrush Scrub
Flame Length	42’	16’	14’	6’
Rate of Spread	318 ch/h	238 ch/h	28 ch/h	39.3 c/ch

As can be seen from the modeling, the greatest anticipated flame length is from the southern mixed chaparral burning during a Peak Santa Ana fire. The resulting flame length is 88 feet. The remaining flame lengths are less than 51 feet. The model is an estimate of the flame lengths that can be anticipated. Actual fire behavior can be more or less intensive.

2.5.3 Fuel Management

The San Diego County Fire Code and the Pine Valley Fire Protection District Code require management of flammable vegetation within 100 feet of structures. The purpose of this zone is to provide the necessary defensible space for fire suppression and to reduce the radiant heat and convective heat that would result from a fire. The project will provide a minimum of 100 feet of fuel management adjacent to the proposed building areas within the pads when they are adjacent to undeveloped lands. Fuel modeling for the live oak woodlands resulted in flame lengths of 25 feet for peak Santa Ana conditions. Fuel management to 100 feet will be at four times the maximum flame length. The fuel management zone adjacent to the chaparral (Figure 7) was modified due to the fact that flame lengths of 88 feet resulted when modeling the peak Santa Ana conditions. The fuel management area adjacent to chaparral will be 176 feet, two times the flame length. Additionally the fuel management zones have been enlarged to reduce the amount of “intermix” areas. The fuel management zones are depicted on the Preliminary Grading Plan, Figure 10. The project is in compliance with the County Fire Code and Pine Valley Fire Protection District Code for fuel management.

2.5.3.1 Zones

Developable Area

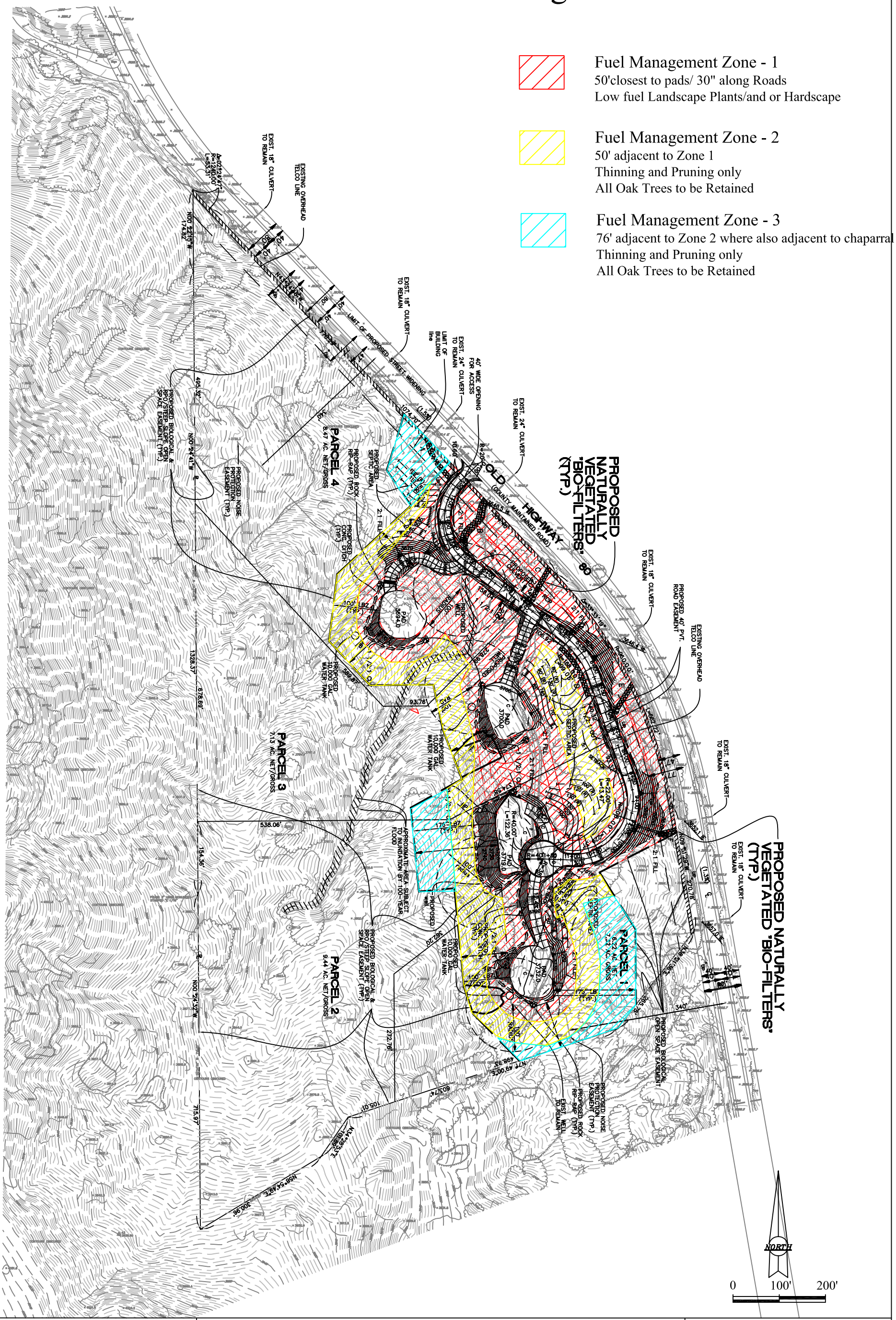
This is the area in which habitable structures may be built. This area is to be maintained the same as Zone 1, below.

Legend:

Fuel Management Zone - 1
50'closest to pads/ 30" along Roads
Low fuel Landscape Plants/and or Hardscape

Fuel Management Zone - 2
50' adjacent to Zone 1
Thinning and Pruning only
All Oak Trees to be Retained

Fuel Management Zone - 3
76' adjacent to Zone 2 where also adjacent to chaparral
Thinning and Pruning only
All Oak Trees to be Retained



RC Biological Consulting, Inc.	Fuel Management Zones Sanders Property TPM 20765	Figure 10

Zone 1

Zone 1 is the minimum of 50' adjacent to the buildable area on the parcel and 30 feet along roadways. This area will be composed of landscaped low fuel plants and/or hardscape. Fuel management within this zone shall consist of landscape plantings that are maintained so that they will not create fire hazards near structures. No fuel management was necessary along portions of Old Highway 80 as the 20 feet of fuel management required adjacent to existing roads was met offsite within the Right-of-Way for Old Highway 80.

All of the plants in this zone must be listed on the County of San Diego's approved plant list or other list acceptable to the Fire Authority having jurisdiction. "Acceptable Plants for Defensible Space in Fire Prone Areas" is included as Appendix E. No plants on the Undesirable Plant List or Invasive Species Plant List shall be planted within this zone or any zone. These lists are included within Appendix F.

Zone 2

Zone 2 is the next 50 feet of required fuel management where applicable. This section shall not be irrigated or planted due to its proximity to the biological open space except under an approved landscape or revegetation plan. All dead or dying trees shall be removed. Thinning of the understory of the oak woodland shall be performed such that the native vegetation retained is composed of small patches with spacing in between. Thinning shall prioritize the removal of the plants on the Undesirable Plant list. All oaks within this zone shall be maintained as discussed below.

Oak Root Zone

Oak trees are to be maintained as described in Section 4707 of the Consolidated Fire Code: All forests and woodlands shall be kept in a healthy state and free of all dead, dying or diseased trees, excluding tree stumps no higher than six inches above the ground. When combustible vegetation is located underneath a tree's drip line, the lowest branch shall be at least three times higher than the understory brush or grasses, or 10 feet, whichever is greater. Debris and trimming produced by tree maintenance shall be removed from the site. This zone is not to be irrigated or landscaped.
Prune and Trim as follows:

- Trees and large shrubs over 15 feet in height (Oaks, Sumac, Toyon, Sycamore, etc.): Prune to provide clearance beneath plants of three (3) times the height of understory plants, or ten (10) feet, whichever is greater.
- Medium–height and understory shrubs (less than 15 feet in height): Thin large continuous masses of shrubs to remove fuel and provide a minimum of ten (10) feet between shrub masses, or individual shrubs.
- Prune remaining shrubs to remove a minimum of 40% of flammable fuel from each plant or shrub mass.

Some native shrubs such as manzanita can be pruned and thinned to reduce fuel load and be aesthetically pleasing.

Zone 3

Zone 3 is the remainder of the fuel management identified on Figure 10, the fuel management zone map.. Native vegetation shall be retained within this zone. The vegetation shall bethinned to ensure that the vegetation does not occupy more than 70% of the area. The thinning shall be performed such that the native vegetation retained is composed of small patches with spacing in between. Thinning shall prioritize the removal of the plants on the Undesirable Plant list. Some native shrubs such as manzanita can be pruned and thinned to reduce fuel load and be aesthetically pleasing.

2.5.3.2 Maintenance

Zone 1

- Conduct annual, or more frequent if necessary, maintenance to reduce fuel volumes, remove dead and detached material, tree and shrub pruning, and maintain in healthy succulent condition;
- Mature trees greater than 18' shall be limbed up to a minimum of 6' above the ground;
- No tree limbs within 10' of chimneys or dead limbs overhanging structures;
- Trees shall not be topped;
- Trees adjacent to or overhanging roadways, driveways, or other emergency access paths shall be maintained with a minimum height clearance of 13' 6".

Zones 2 and 3

- Conduct annual, or more frequent if necessary, maintenance to reduce fuel volumes, remove non-native, dead and detached material, and maintain in healthy succulent condition;
- Annually – Remove plants on the invasive plant list that may have become established.
- Maintain oak trees in accordance with Section 4707.3.3. Oaks within Zone 2 and the Oak Root Zone shall be pruned to provide clearance of three times the height of the understory plant material or ten feet whichever is higher. Vegetation maintenance shall be the responsibility of the owner as designated with the County Tax Assessor.

2.6 Cumulative Impact Analysis

The project meets or exceeds all codes and standards therefore will not contribute to a significantly cumulative impact to fire services.

3.0 MITIGATION MEASURES AND DESIGN CONSIDERATIONS

The project has been designed in conformance with all codes and regulations. The project is providing a minimum of 100 feet of fuel management adjacent to the proposed pad locations

and 30 feet adjacent to proposed roads. The project has been designed to include a maximum of a 176 ft fuel management zone where pads are proposed next to chaparral. The project has also been designed to minimize the amount of "intermix" habitat.

The project will be required to utilize construction methods for exterior wildfire exposure as defined in Chapter 7a of the County of San Diego Building Code (County 2008).

The mitigation measures can not ensure that structures will not be lost during as a result of a wildland fire however they reduce the risk associated with building within the wildland-urban interface.

4.0 CONCLUSION

The project is designed in conformance and meets or exceeds all applicable codes and standards. The project will not expose people or structures to a significant risk of loss, injury, or death as a result of wildland fires. The project will not will not have a substantial adverse impact to services including response time that would result in physical impacts with environmental effects. The project has adequate emergency access. The project will have sufficient water supplies available to serve the project from four 10,000 gallon water tanks. As a result there are no significant impacts pursuant to CEQA.

5.0 LIST OF PREPARERS AND PERSONS AND ORGANIZATIONS CONTACTED

Preparers

Robin Church, President, RC Biological Consulting, Inc. (619) 463-1072
Organizations Contacted

Pine Valley Fire Protection District (619-473-8445)

6.0 REFERENCES CITED OR CONSULTED

Pine Valley Fire Protection District. Fire Code

California Building Code 2007. Chapter 7A.

California Fire Code 2007. California Code of Regulations Title 24, Part 9.

County of San Diego 1979. General Plan – Safety Element.

County of San Diego 1999. Standards for Private Roads. Department of Public Works. Adopted June 30, 1999.

County of San Diego 2007. Consolidated Fire Code. Adopted July 2007.

County of San Diego 2007. Guidelines For Determining Significance and Report Format and Content Requirements for Wildland Fire and Fire Protection

County of San Diego 2008. San Diego County Code of Regulatory Ordinances, Title 9, Fire Code, Ordinance No. 9915, new series.

County of San Diego 2008. San Diego County Code of Regulatory Ordinances, Title 9, Fire and Building Code, Ordinance No. 9915, new series.

County of San Diego. Acceptable Plants For A Defensible Space In Fire Prone Areas. http://www.co.san-diego.ca.us/cnty/cntydepts/landuse//fire_resistant.html

National Fire Protection Agency 2007. NFPA 13: Standard for the Installation of Sprinkler Systems.

Western Regional Climate Center. http://www.wrcc.dri.edu/

7.0 ERRORS AND OMMISSIONS

RC Biological Consulting, Inc. disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document by applicant or any regulatory or permitting agency.

APPENDIX A

FIRE SERVICE AVAILABILITY LETTER

COUNTY OF SAN DIEGO
DEPT. OF PLANNING & LAND USE
5201 RUFFIN ROAD, SUITE B
SAN DIEGO, CA 92123-1666
(858) 565-5981 • (888) 267-8770

PROJECT FACILITY AVAILABILITY FORM

FIRE

F

Please type or use pen

JAMES A. SANDERS, JR. 760/344-2310
Owner's Name Phone

P.O. BOX 232
Owner's Mailing Address Street

BRAWLEY CA 92227
City State Zip

ORG_____
ACCT_____
ACT_____
TASK_____
DATE_____ AMT $_____
DISTRICT CASHIER'S USE ONLY

SECTION 1. PROJECT DESCRIPTION — TO BE COMPLETED BY APPLICANT

A. ☐ Major Subdivision (TM) ☐ Specific Plan or Specific Plan Amendment
☒ Minor Subdivision (TPM) ☐ Certificate of Compliance:_____
☐ Boundary Adjustment
☐ Rezone (Reclassification) from_____ to_____ zone.
☐ Major Use Permit (MUP), purpose:_____
☐ Time Extension...Case No._____
☐ Expired Map...Case No._____
☐ Other_____

B. ☒ Residential . . . . . Total number of dwelling units 4
☐ Commercial . . . . . Gross floor area_____
☐ Industrial . . . . . Gross floor area_____
☐ Other . . . . . Gross floor area_____

C. Total Project acreage 32.36 Total lots 4 Smallest proposed lot 7.13

Assessor's Parcel Number(s)
(Add extra if necessary)

410-410	010-030	07-20

Thomas Bros. Page 1237 Grid B5

OLD HIGHWAY 80
Project address Street

CENTRAL MTN. 91962
Community Planning Area/Subregion Zip

OWNER/APPLICANT AGREES TO COMPLETE ALL CONDITIONS REQUIRED BY THE DISTRICT.

Applicant's Signature:_____ Date: 10/21/08

Address: 8348 CENTER DR., SUITE G., LA MESA 91942 Phone: 619/697-9234

(On completion of above, present to the district that provides fire protection to complete Section 2 and 3 below.)

SECTION 2: FACILITY AVAILABILITY — TO BE COMPLETED BY DISTRICT

District name Pine Valley FPD

Indicate the location and distance of the primary fire station that will serve the proposed project: 28850 Old Hwy 80 Pine Valley CA 91962 about 1 mile from location 2 mins.

A. ☒ Project is in the District and eligible for service.
☐ Project is not in the District but is within its Sphere of Influence boundary, owner must apply for annexation.
☐ Project is not in the District and not within its Sphere of Influence boundary.
☐ Project is not located entirely within the District and a potential boundary issue exists with the _____ District.

B. ☒ Based on the capacity and capability of the District's existing and planned facilities, fire protection facilities are currently adequate or will be adequate to serve the proposed project. The expected emergency travel time to the proposed project is 2 minutes.
☐ Fire protection facilities are not expected to be adequate to serve the proposed development within the next five years.

C. ☒ District conditions are attached. Number of sheets attached: 1
☐ District will submit conditions at a later date.

SECTION 3. FUELBREAK REQUIREMENTS

Note: The fuelbreak requirements prescribed by the fire district for the proposed project do not authorize any clearing prior to project approval by the Department of Planning and Land Use.

☐ Within the proposed project _____ feet of clearing will be required around all structures.
☒ The proposed project is located in a hazardous wildland fire area, and additional fuelbreak requirements may apply. Environmental mitigation requirements should be coordinated with the fire district to ensure that these requirements will not pose fire hazards.

This Project Facility Availability Form is valid until final discretionary action is taken pursuant to the application for the proposed project or until it is withdrawn, unless a shorter expiration date is otherwise noted.

Authorized signature | Scott MacKellar Captain *Print name and title* | (619)473-8485 *Phone* | 11/10/08 *Date*

On completion of Section 2 and 3 by the District, applicant is to submit this form with application to:
Zoning Counter, Department of Planning and Land Use, 5201 Ruffin Road, Suite B, San Diego, CA 92123

DPLU-399F (09/06)

APPENDIX B

FUEL PARAMETERS

Fuel Model 4

Fuel Model Number	4
Fuel Model Name	4
Fuel Model Type	Static
Description	Chaparral [4]
1-h Fuel Load	5 tons/ac
10-h Fuel Load	4 tons/ac
100-h Fuel Load	2 tons/ac
Live Herbaceous Fuel Load	0 tons/ac
Live Woody Fuel Load	5 tons/ac
1-h Surface Area/Vol Ratio	2000 ft2/ft3
Live Herbaceous Surface Area/Vol Ratio	1500 ft2/ft3
Live Woody Surface Area/Vol Ratio	1500 ft2/ft3
Fuel Bed Depth	6 feet
Dead Fuel Moisture of Extinction	20 percent
Dead Fuel Heat Content	8000 Btu/lb
Live Fuel Heat Content	8000 Btu/lb

Fuel Model tu5

Fuel Model Number	165
Fuel Model Name	tu5
Fuel Model Type	Static
Description	Very high load, dry climate timber-shrub (S)
1-h Fuel Load	4 tons/ac
10-h Fuel Load	4 tons/ac
100-h Fuel Load	3 tons/ac
Live Herbaceous Fuel Load	0 tons/ac
Live Woody Fuel Load	3 tons/ac
1-h Surface Area/Vol Ratio	1500 ft2/ft3
Live Herbaceous Surface Area/Vol Ratio	1800 ft2/ft3
Live Woody Surface Area/Vol Ratio	750 ft2/ft3
Fuel Bed Depth	1 feet
Dead Fuel Moisture of Extinction	25 percent
Dead Fuel Heat Content	8000 Btu/lb
Live Fuel Heat Content	8000 Btu/lb

Fuel Model sh1

Fuel Model Number	141
Fuel Model Name	sh1
Fuel Model Type	Dynamic
Description	Low load, dry climate shrub (D)
1-h Fuel Load	0.25 tons/ac
10-h Fuel Load	0.25 tons/ac
100-h Fuel Load	0 tons/ac
Live Herbaceous Fuel Load	0.15 tons/ac
Live Woody Fuel Load	1.3 tons/ac
1-h Surface Area/Vol Ratio	2000 ft2/ft3
Live Herbaceous Surface Area/Vol Ratio	1800 ft2/ft3
Live Woody Surface Area/Vol Ratio	1600 ft2/ft3
Fuel Bed Depth	1 feet
Dead Fuel Moisture of Extinction	15 percent
Dead Fuel Heat Content	8000 Btu/lb
Live Fuel Heat Content	8000 Btu/lb

Fuel Model gr4

Fuel Model Number	104
Fuel Model Name	gr4
Fuel Model Type	Dynamic
Description	Moderate load, dry climate grass (D)
1-h Fuel Load	0.25 tons/ac
10-h Fuel Load	0 tons/ac
100-h Fuel Load	0 tons/ac
Live Herbaceous Fuel Load	1.9 tons/ac
Live Woody Fuel Load	0 tons/ac
1-h Surface Area/Vol Ratio	2000 ft2/ft3
Live Herbaceous Surface Area/Vol Ratio	1800 ft2/ft3
Live Woody Surface Area/Vol Ratio	1500 ft2/ft3
Fuel Bed Depth	2 feet
Dead Fuel Moisture of Extinction	15 percent
Dead Fuel Heat Content	8000 Btu/lb
Live Fuel Heat Content	8000 Btu/lb

APPENDIX C

FUEL MODELING

Fire Modeling For: Sanders Property – Santa Ana - NORMAL

Behave Version: 3.0.2

Modeled by: Jimmy McMorran

Parcel	Habitat	Fuel Model	Fuel Moisture	20-Ft Wind Speed MI/H	Wind Direction	Slope	Aspect	Flame Length (Ft)	Direction of Max Spread
1	ILOW/SMC/ BSS	4-TU5	3/50	24	45	7/26	45	51	225
2	ILOW/SMC/ BSS	4-TU5	3/50	24	45	7/26	45	51	225
3	ILOW/SMC/ BSS	4-TU5	3/50	24	45	7/26	45	51	225
4	ILOW/SMC/ BSS	4-TU5	3/50	24	45	7/26	45	51	225
Offsite	NNG/BSS	GR4-SH1	3/50	24	45	0	45	20	225
Offsite	NNG/BSS	GR4-SH1	3/50	24	45	0	45	20	225
Offsite	NNG/BSS	GR4-SH1	3/50	24	45	0	45	20	225
Offsite	NNG/BSS	GR4-SH1	3/50	24	45	0	45	20	225

ILOW = Interior Live Oak Woodland, SMC = Southern Mixed Chaparral, BSS = Big Sagebrush Scrub, NNG = Non-Native Grasslands

Fire Modeling For: Sanders Property – Santa Ana - PEAK

Behave Version: 3.0.2

Modeled by: Jimmy McMorran

Parcel	Habitat	Fuel Model	Fuel Moisture	20-Ft Wind Speed MI/H	Wind Direction	Slope	Aspect	Flame Length (Ft)	Direction of Max Spread
1	ILOW/SMC/ BSS	4-TU5	3/50	56	45	7/26	45	88	225
2	ILOW/SMC/ BSS	4-TU5	3/50	56	45	7/26	45	88	225
3	ILOW/SMC/ BSS	4-TU5	3/50	56	45	7/26	45	88	225
4	ILOW/SMC/ BSS	4-TU5	3/50	56	45	7/26	45	88	225
Offsite	NNG/BSS	GR4-SH1	3/50	56	45	0	45	33	225
Offsite	NNG/BSS	GR4-SH1	3/50	56	45	0	45	33	225
Offsite	NNG/BSS	GR4-SH1	3/50	56	45	0	45	33	225
Offsite	NNG/BSS	GR4-SH1	3/50	56	45	0	45	33	225

ILOW = Interior Live Oak Woodland, SMC = Southern Mixed Chaparral, BSS = Big Sagebrush Scrub, NNG = Non-Native Grasslands

Fire Modeling For: Sanders Property – SUMMER

Behave Version: 3.0.2

Modeled by: Jimmy McMorran

Parcel	Habitat	Fuel Model	Fuel Moisture	20-Ft Wind Speed MI/H	Wind Direction	Slope	Aspect	Flame Length (Ft)	Direction of Max Spread
1	ILOW/SMC/ BSS	4-TU5	3/50	18	270	7/26	45	42	93
2	ILOW/SMC/ BSS	4-TU5	3/50	18	270	7/26	45	42	93
3	ILOW/SMC/ BSS	4-TU5	3/50	18	270	7/26	45	42	93
4	ILOW/SMC/ BSS	4-TU5	3/50	18	270	7/26	45	42	93
Offsite	NNG/BSS	GR4-SH1	3/50	18	270	0	45	16	90
Offsite	NNG/BSS	GR4-SH1	3/50	18	270	0	45	16	90
Offsite	NNG/BSS	GR4-SH1	3/50	18	270	0	45	16	90
Offsite	NNG/BSS	GR4-SH1	3/50	18	270	0	45	16	90

ILOW = Interior Live Oak Woodland, SMC = Southern Mixed Chaparral, BSS = Big Sagebrush Scrub, NNG = Non-Native Grasslands

Modules: SURFACE, SCORCH

Description		Sanders-Santa Ana-NORMAL

Fuel/Vegetation, Surface/Understory

Fuel Model		sh1

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	24
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

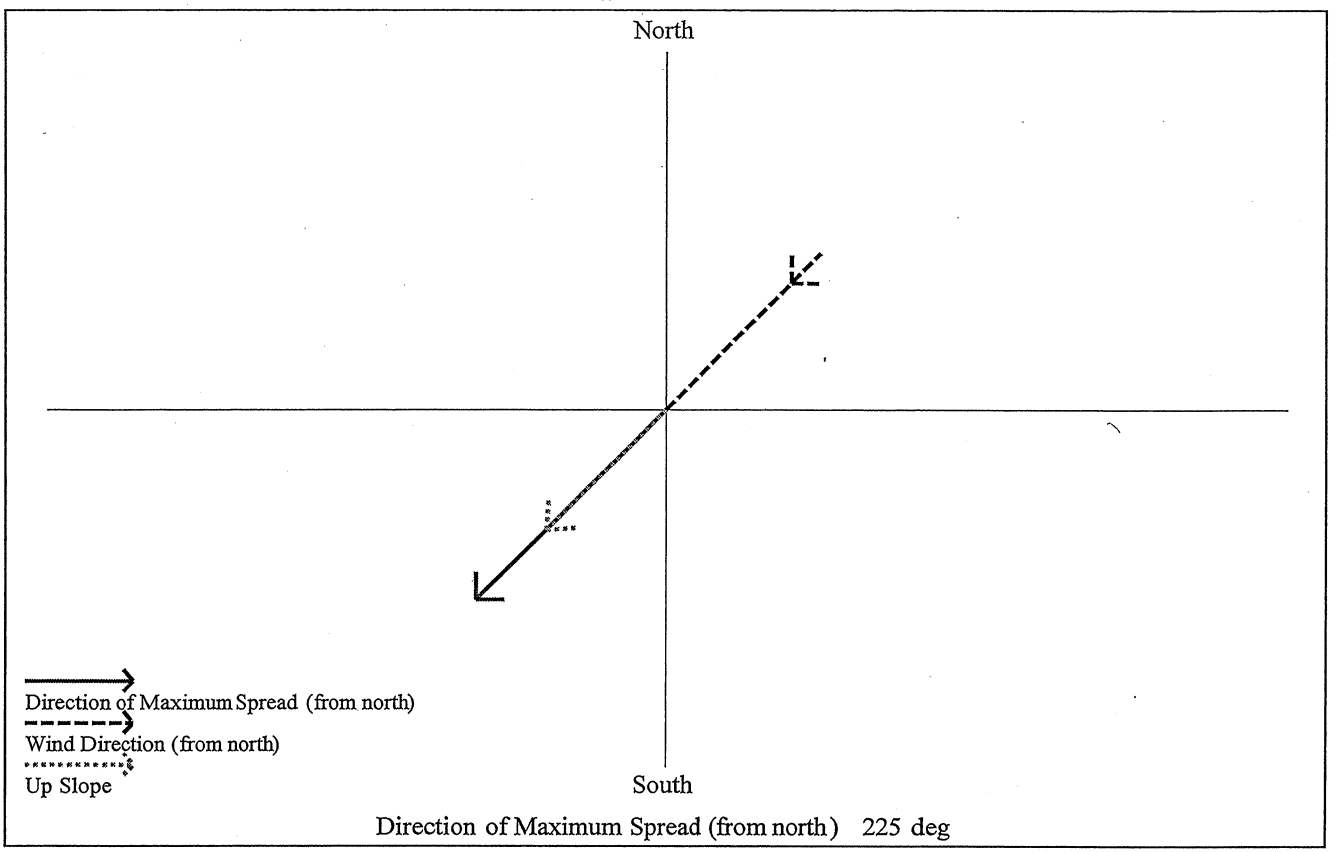
Notes

Sanders-Santa Ana-NORMAL

Surface Rate of Spread (maximum)	58.2	ch/h
Flame Length	7.2	ft
Direction of Maximum Spread (from north)	225	deg
Midflame Wind Speed	12.0	mi/h
Wind Adjustment Factor	0.5	
Scorch Height	50	ft

Sanders-Santa Ana-NORMAL

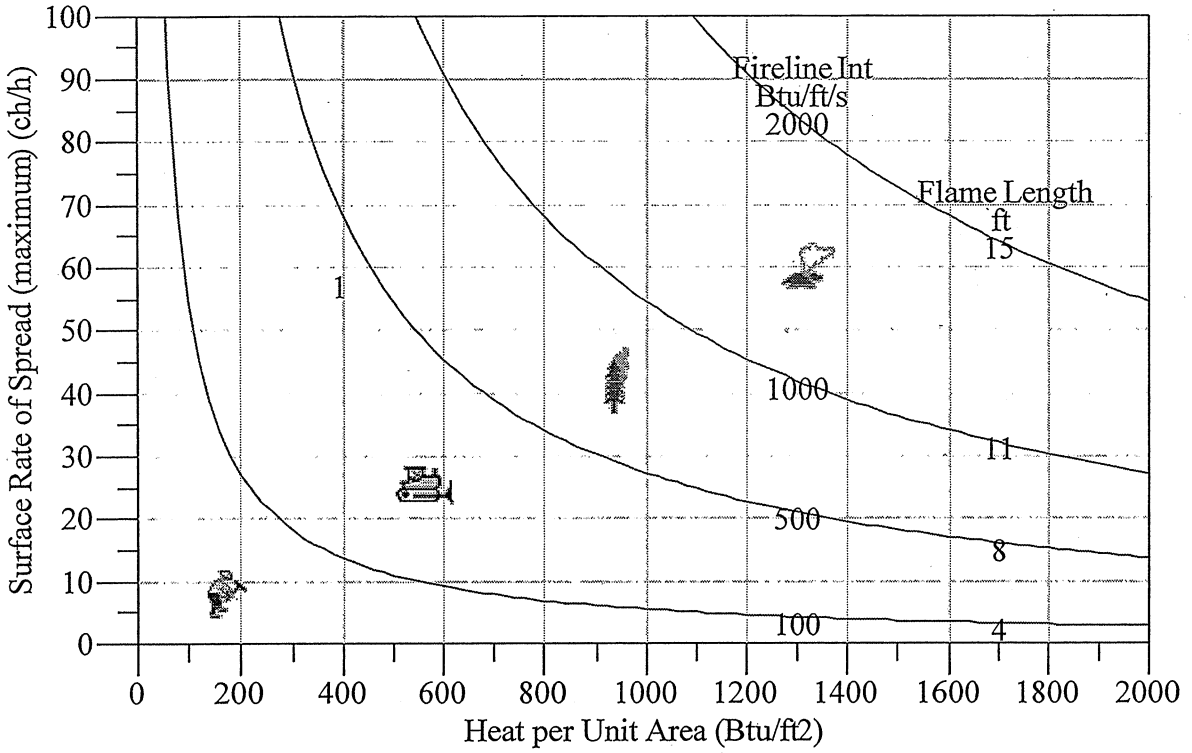
Wind / Slope / Fire Directions



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-NORMAL

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-NORMAL

Fuel Model

sh1 Low load, dry climate shrub (D) (141)

Modules: SURFACE, SCORCH

Description		Sanders-Santa Ana-NORMAL

Fuel/Vegetation, Surface/Understory

Fuel Model		gr4

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	24
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

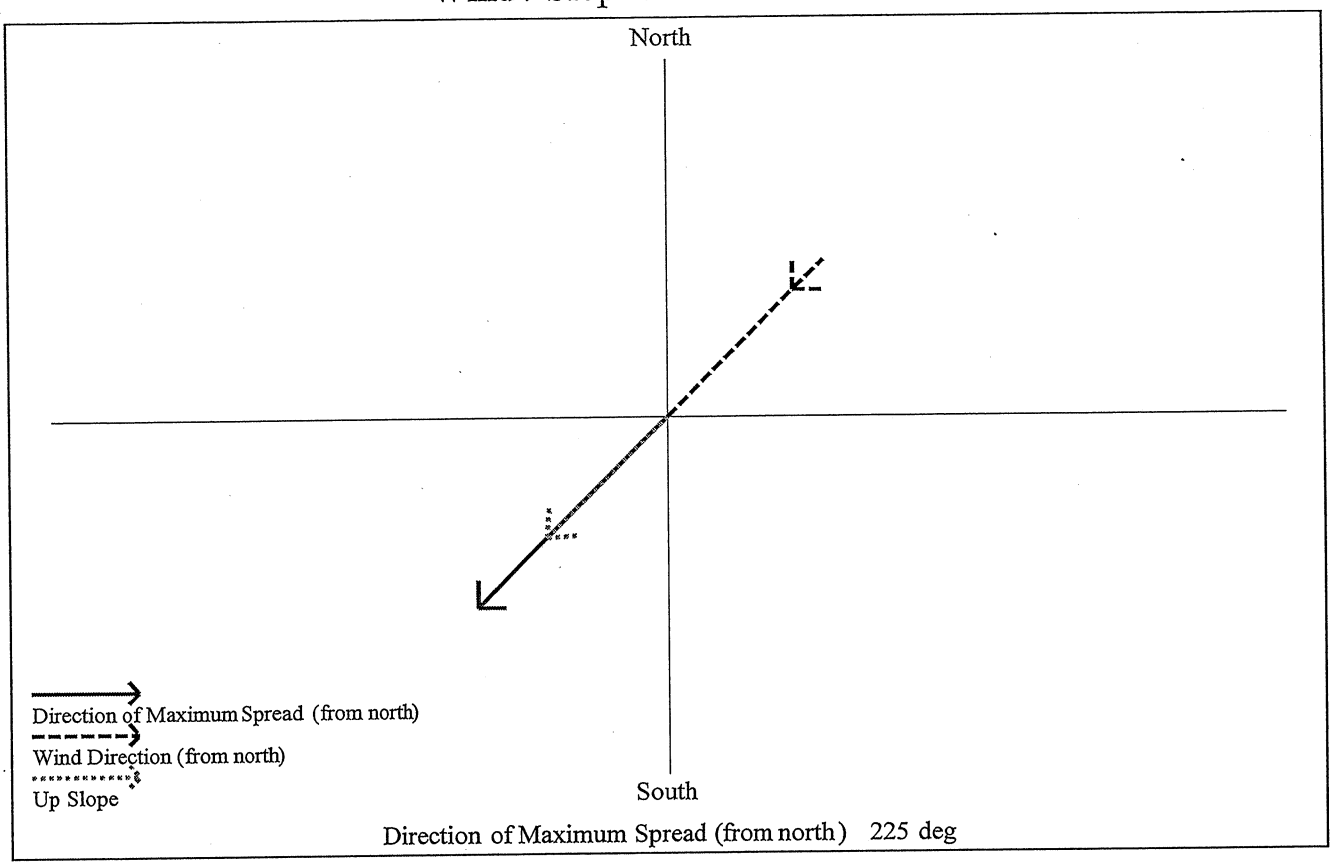
Notes

Sanders-Santa Ana-NORMAL

Surface Rate of Spread (maximum)	360.6	ch/h
Flame Length	19.4	ft
Direction of Maximum Spread (from north)	225	deg
Midflame Wind Speed	12.0	mi/h
Wind Adjustment Factor	0.5	
Scorch Height	390	ft

Sanders-Santa Ana-NORMAL

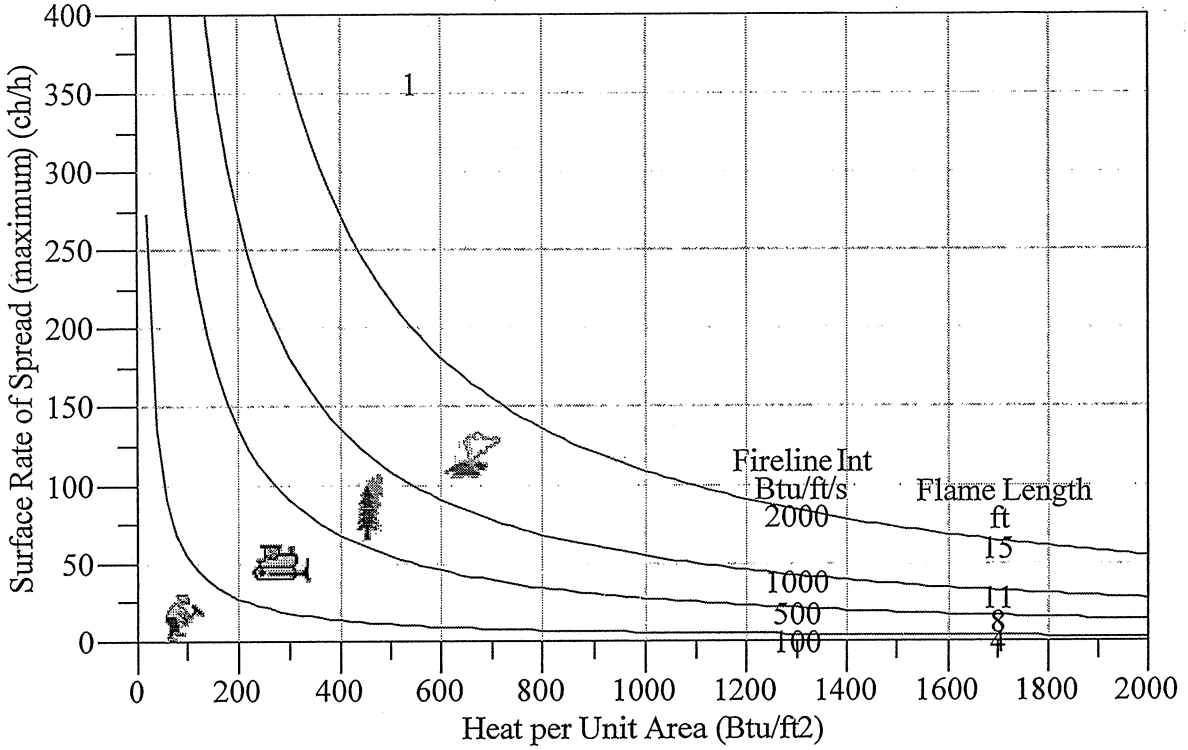
Wind / Slope / Fire Directions



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-NORMAL

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-NORMAL

Fuel Model

gr4 Moderate load, dry climate grass (D) (104)

Modules: SURFACE, SCORCH

Description		Sanders-Santa Ana-NORMAL

Fuel/Vegetation, Surface/Understory

Fuel Model		4, tu5

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	24
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109

Terrain

Slope Steepness	%	7,26
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Notes

Sanders-Santa Ana-NORMAL

Surface Rate of Spread (maximum) (ch/h)

Fuel Model	Slope Steepness %	
	7	26
4	474.9	488.5
tu5	38.6	40.2

Sanders-Santa Ana-NORMAL

Flame Length (ft)

Fuel Model	Slope Steepness %	
	7	26
4	50.4	51.1
tu5	15.4	15.7

Sanders-Santa Ana-NORMAL

Direction of Maximum Spread (from north) (deg)

Fuel Model	Slope Steepness %	
	7	26
4	225	225
tu5	225	225

Sanders-Santa Ana-NORMAL

Midflame Wind Speed (mi/h)

Fuel Model	Slope Steepness %	
	7	26
4	12.0	12.0
tu5	12.0	12.0

Sanders-Santa Ana-NORMAL

Wind Adjustment Factor

Fuel Model	Slope Steepness %	
	7	26
4	0.5	0.5
tu5	0.5	0.5

Sanders-Santa Ana-NORMAL

Scorch Height (ft)

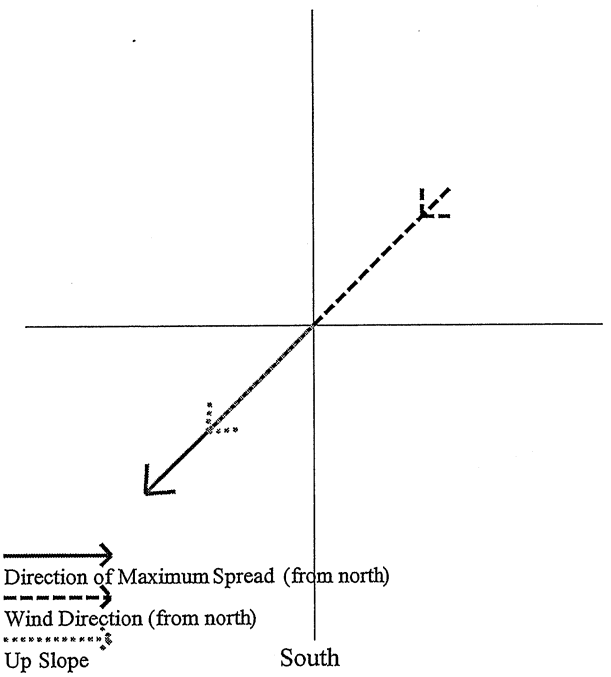
Fuel Model	Slope Steepness %	
	7	26
4	1842	1878
tu5	254	263

Sanders-Santa Ana-NORMAL

Wind / Slope / Fire Directions

Fuel Model : 4

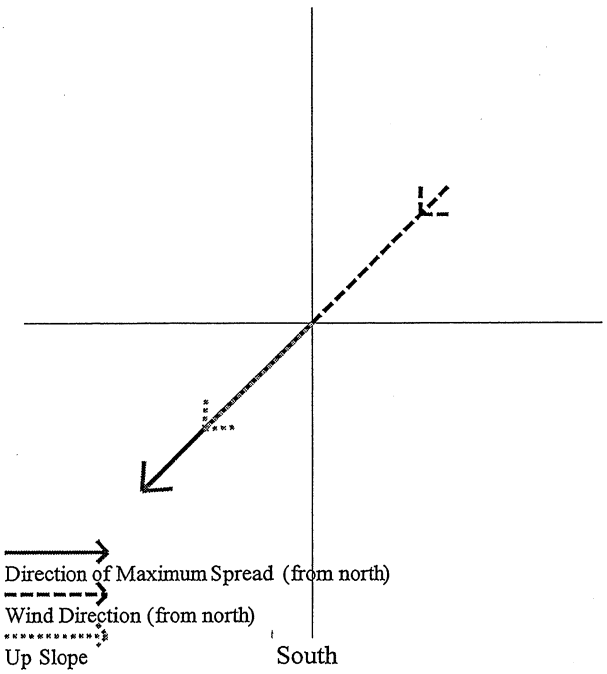
Slope Steepness : 7 %



Direction of Maximum Spread (from north) 225 deg

Fuel Model : 4

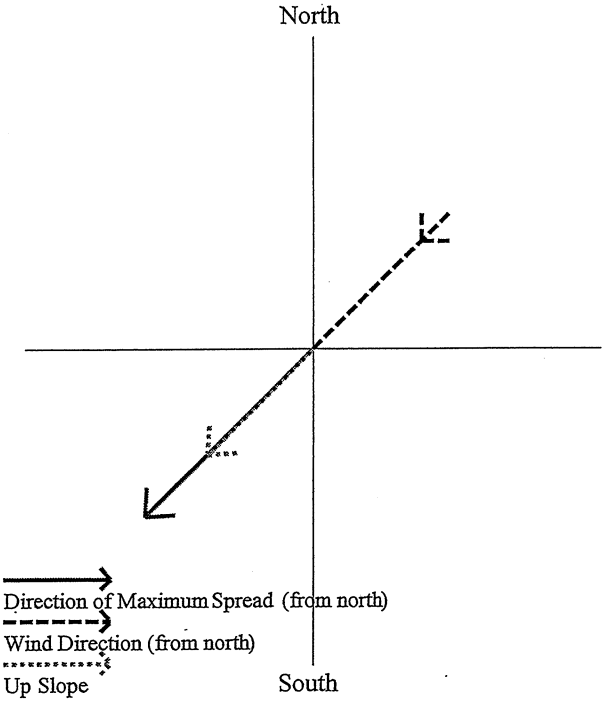
Slope Steepness : 26 %



Direction of Maximum Spread (from north) 225 deg

Fuel Model : tu5

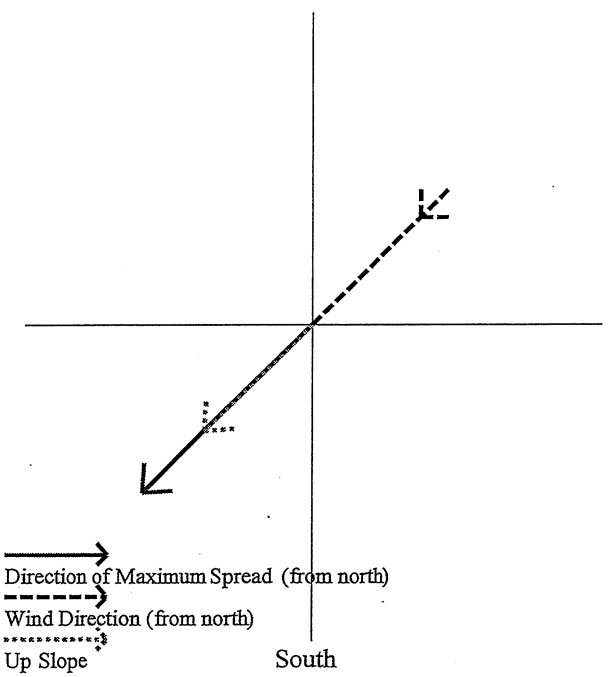
Slope Steepness : 7 %



Direction of Maximum Spread (from north) 225 deg

Fuel Model : tu5

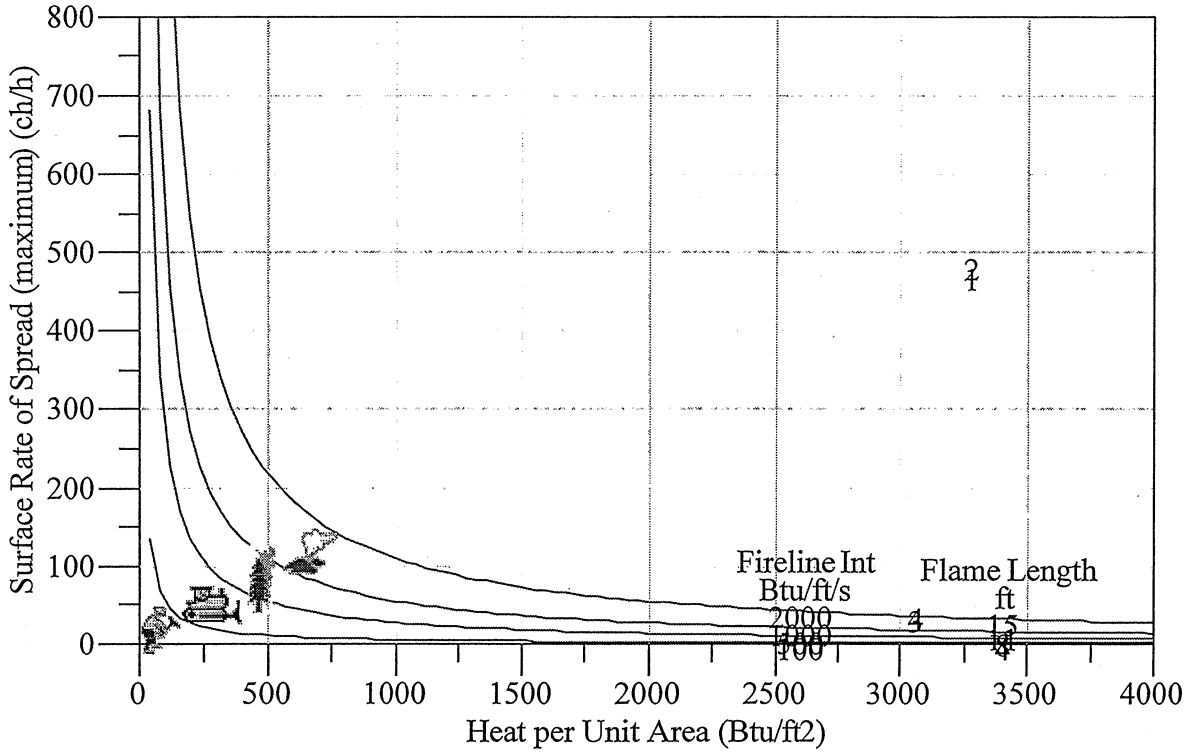
Slope Steepness : 26 %



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-NORMAL

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-NORMAL

Fuel Model

4	Chaparral (S)
tu5	Very high load, dry climate timber-shrub (S) (165)

Modules: SURFACE, SCORCH

Description: Sanders-Santa Ana-PEAK

Fuel/Vegetation, Surface/Understory

Fuel Model		sh1

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	56
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

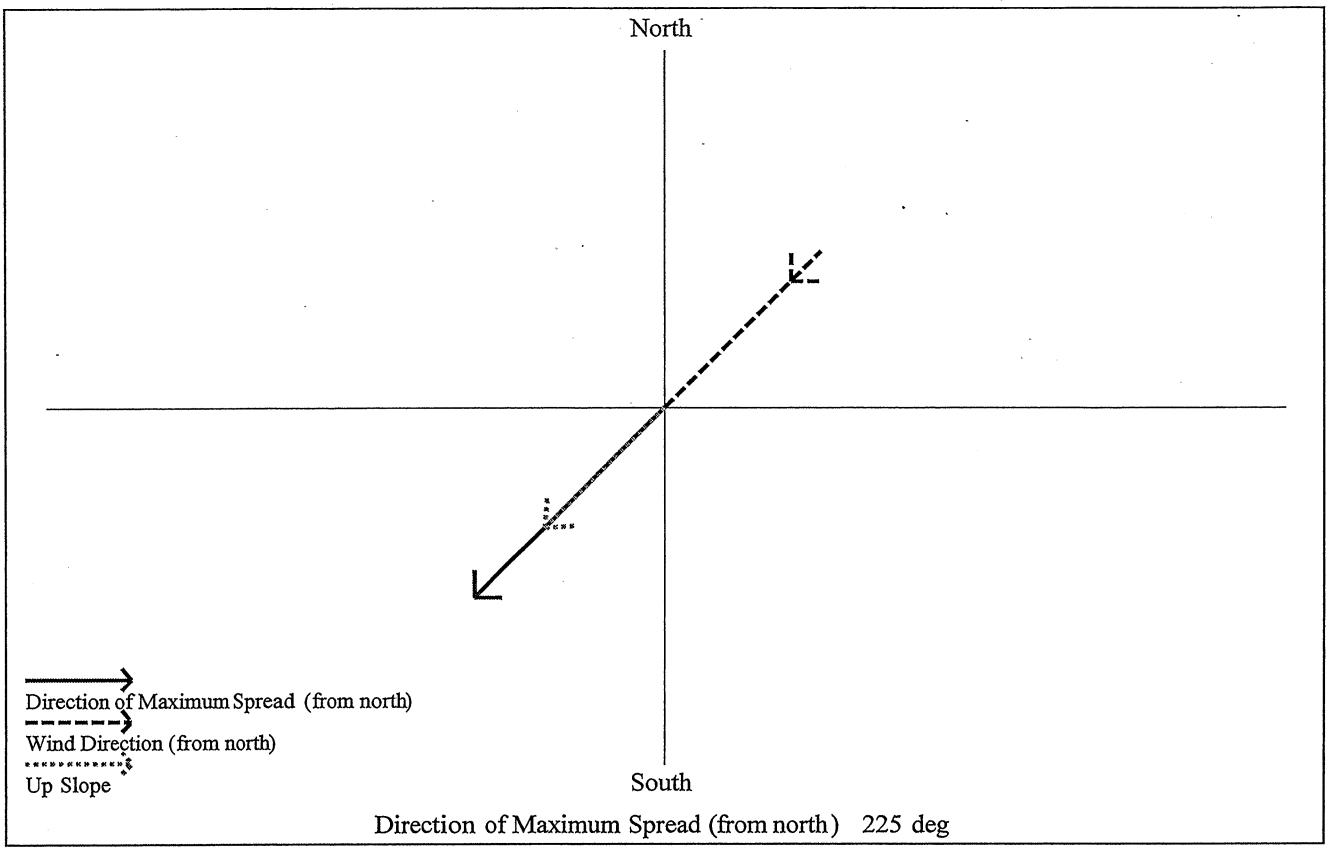
Notes

Sanders-Santa Ana-PEAK

Surface Rate of Spread (maximum)	98.3	ch/h
Flame Length	9.2	ft
Direction of Maximum Spread (from north)	225	deg
Midflame Wind Speed	28.0	mi/h
Wind Adjustment Factor	0.5	
Scorch Height	29	ft

Sanders-Santa Ana-PEAK

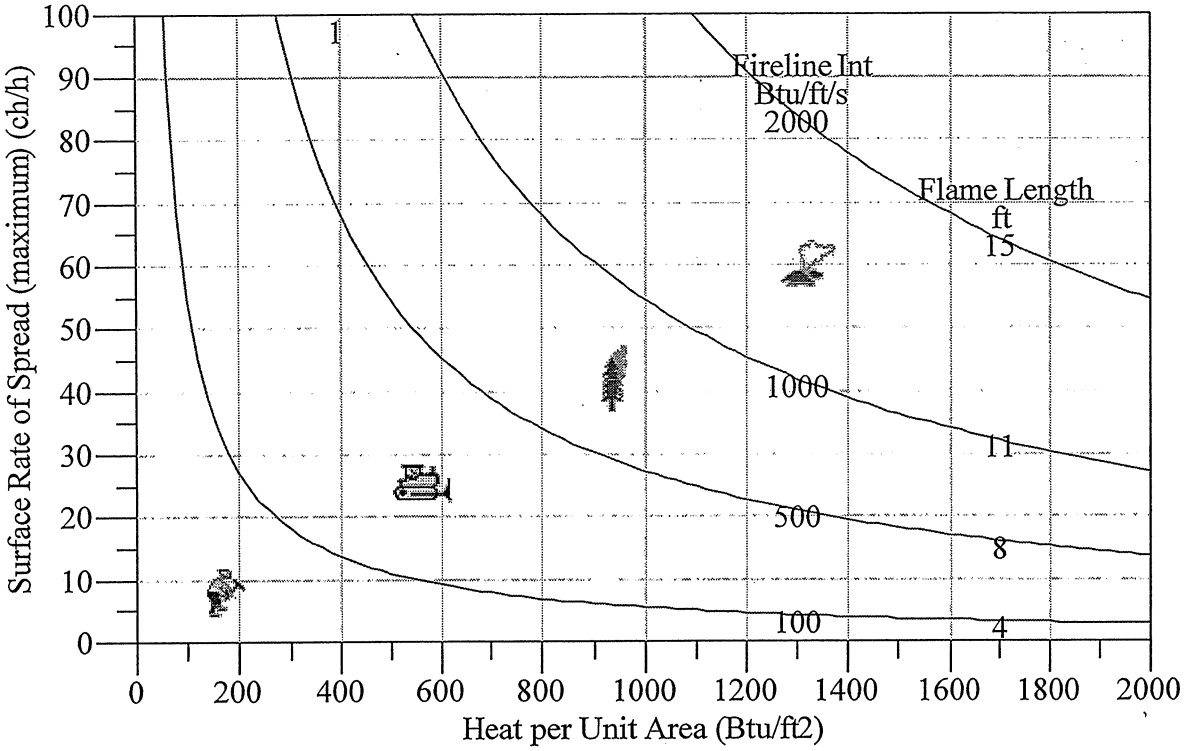
Wind / Slope / Fire Directions



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-PEAK

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-PEAK

Fuel Model

sh1 Low load, dry climate shrub (D) (141)

Modules: SURFACE, SCORCH

Description		Sanders-Santa Ana-PEAK

Fuel/Vegetation, Surface/Understory

Fuel Model		gr4

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	56
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

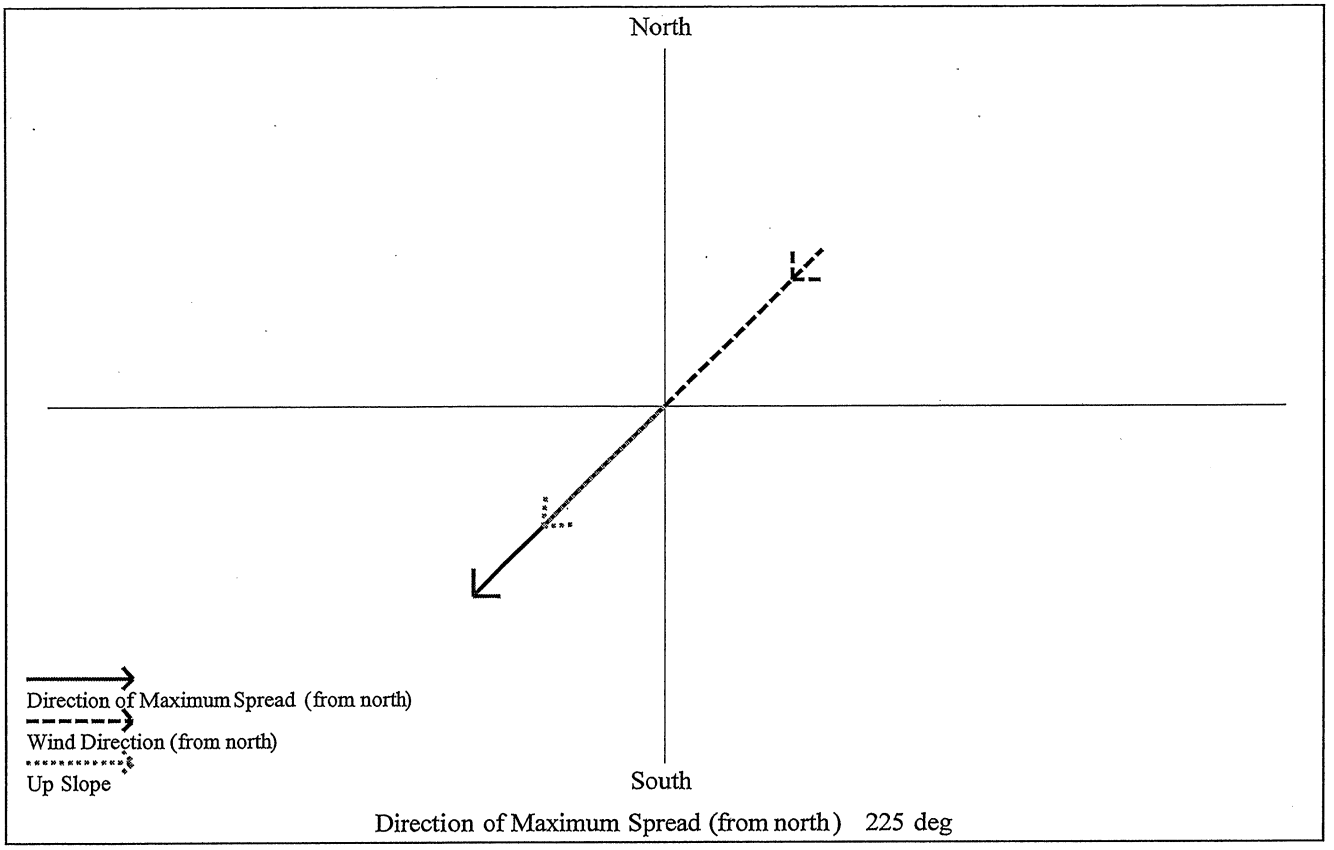
Notes

Sanders-Santa Ana-PEAK

Surface Rate of Spread (maximum)	1121.6	ch/h
Flame Length	32.7	ft
Direction of Maximum Spread (from north)	225	deg
Midflame Wind Speed	28.0	mi/h
Wind Adjustment Factor	0.5	
Scorch Height	587	ft

Sanders-Santa Ana-PEAK

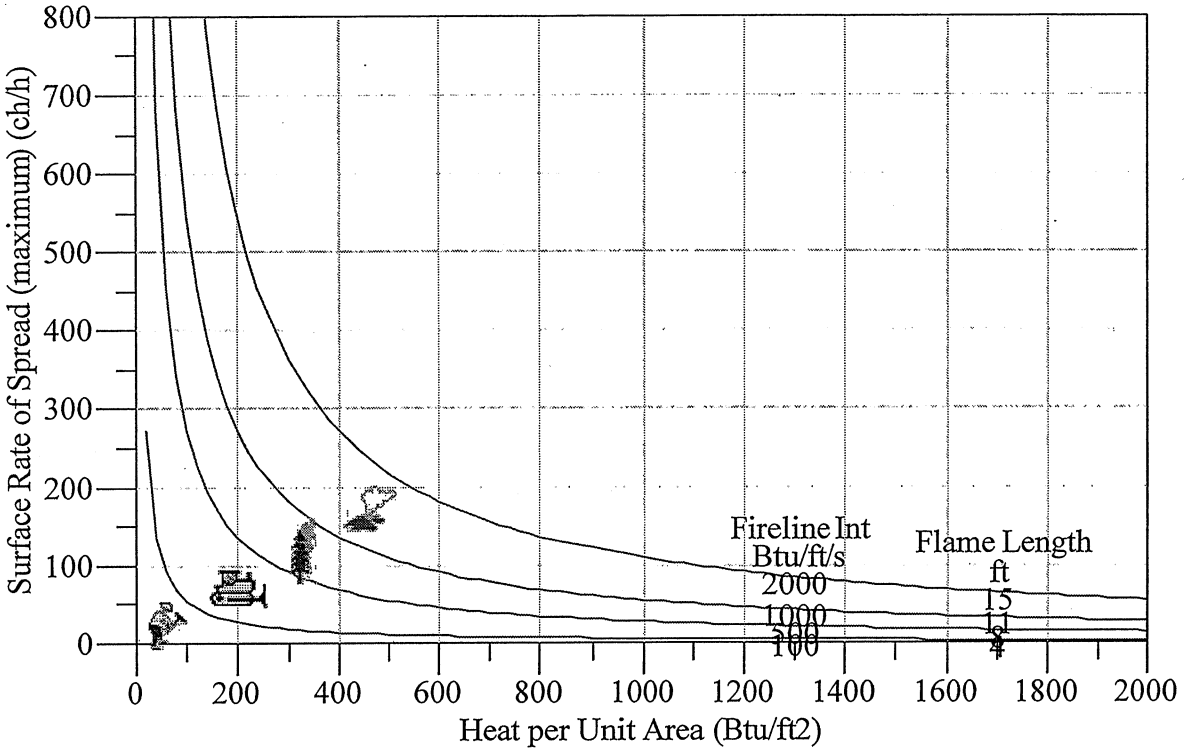
Wind / Slope / Fire Directions



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-PEAK

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-PEAK

Fuel Model

gr4 Moderate load, dry climate grass (D) (104)

Modules: SURFACE, SCORCH

Description		Sanders-Santa Ana-PEAK
Fuel/Vegetation, Surface/Understory		
Fuel Model		4, tu5
Fuel Moisture		
Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50
Weather		
20-ft Wind Speed	mi/h	56
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	45
Air Temperature	oF	109
Terrain		
Slope Steepness	%	7,26
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Notes

Sanders-Santa Ana-PEAK

Surface Rate of Spread (maximum) (ch/h)

Fuel Model	Slope Steepness %	
	7	26
4	1560.7	1574.4
tu5	101.6	103.2

Sanders-Santa Ana-PEAK

Flame Length (ft)

Fuel Model	Slope Steepness %	
	7	26
4	87.1	87.5
tu5	24.1	24.2

Sanders-Santa Ana-PEAK

Direction of Maximum Spread (from north) (deg)

Fuel Model	Slope Steepness %	
	7	26
4	225	225
tu5	225	225

Sanders-Santa Ana-PEAK

Midflame Wind Speed (mi/h)

Fuel Model	Slope Steepness %	
	7	26
4	28.0	28.0
tu5	28.0	28.0

Sanders-Santa Ana-PEAK

Wind Adjustment Factor

Fuel Model	Slope Steepness %	
	7	26
4	0.5	0.5
tu5	0.5	0.5

Sanders-Santa Ana-PEAK

Scorch Height (ft)

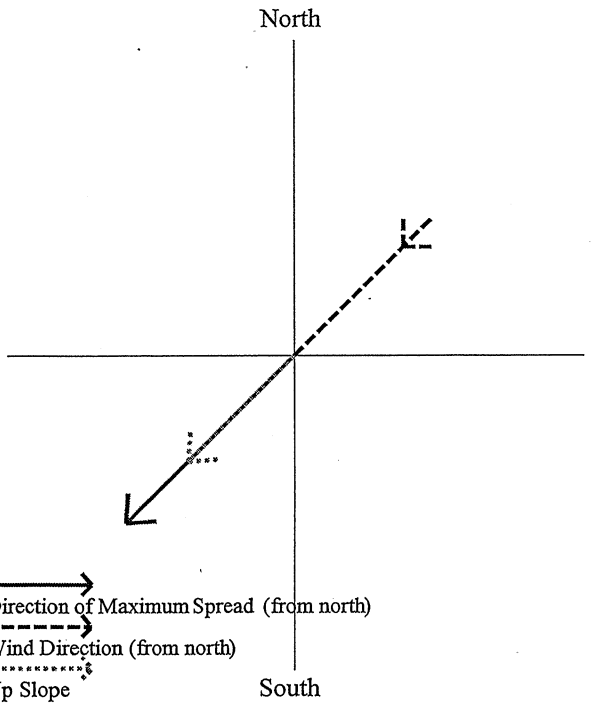
Fuel Model	Slope Steepness %	
	7	26
4	3774	3799
tu5	295	300

Sanders-Santa Ana-PEAK

Wind / Slope / Fire Directions

Fuel Model : 4

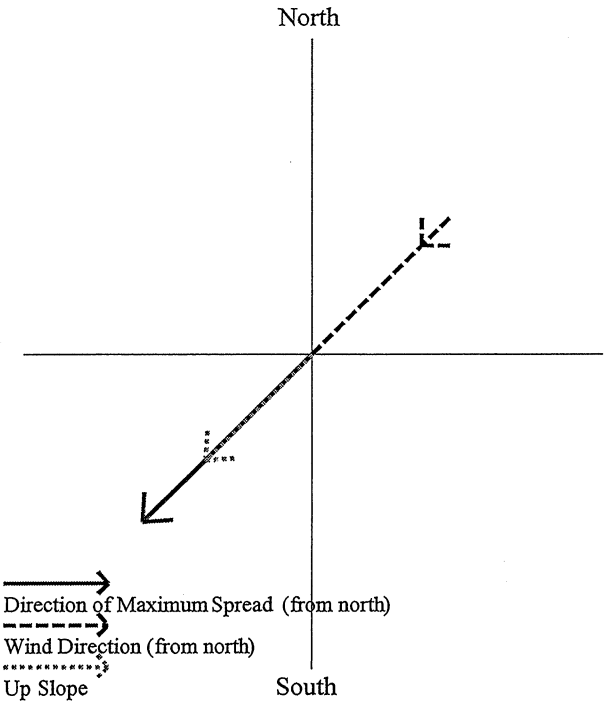
Slope Steepness : 7 %



Direction of Maximum Spread (from north) 225 deg

Fuel Model : 4

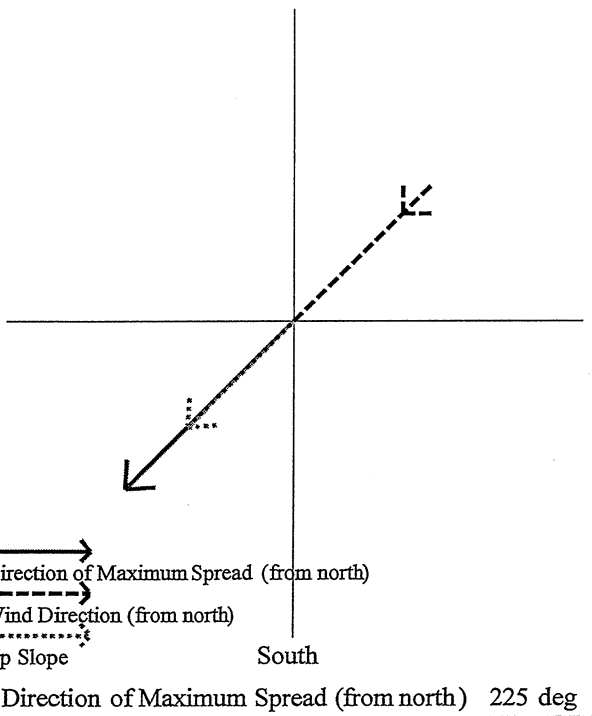
Slope Steepness : 26 %



Direction of Maximum Spread (from north) 225 deg

Fuel Model : tu5

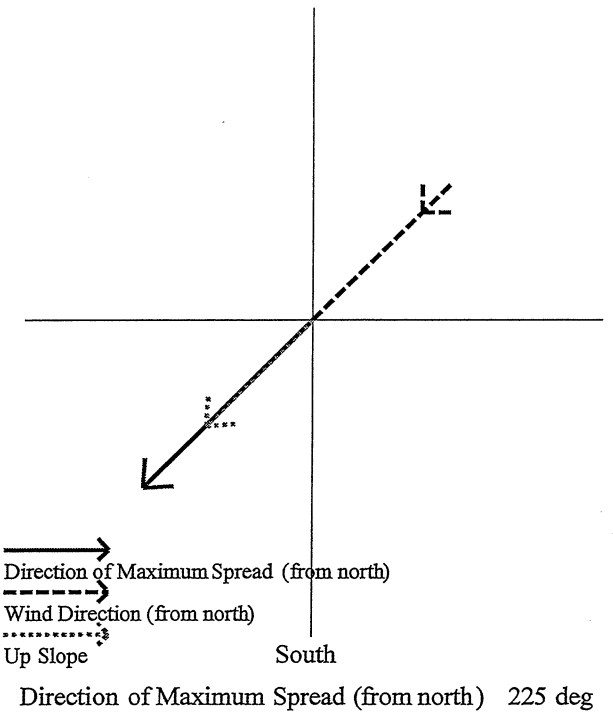
Slope Steepness : 7 %



Direction of Maximum Spread (from north) 225 deg

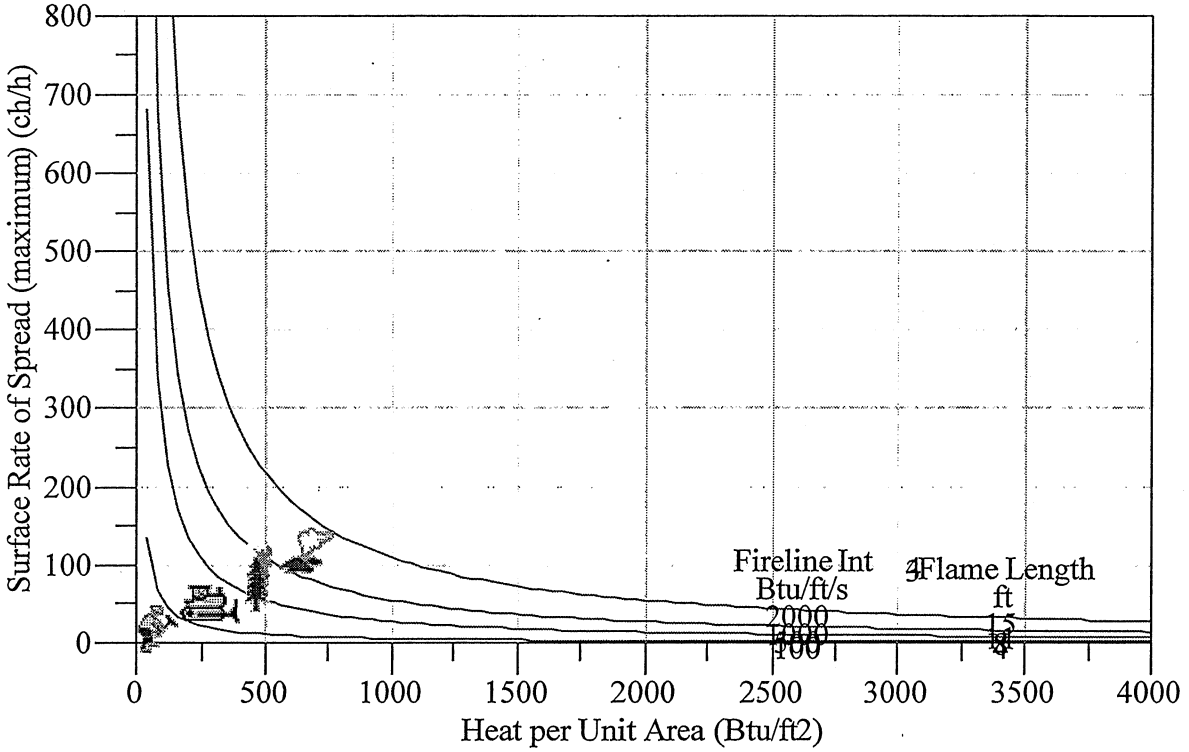
Fuel Model : tu5

Slope Steepness : 26 %



Direction of Maximum Spread (from north) 225 deg

Sanders-Santa Ana-PEAK
Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-Santa Ana-PEAK

Fuel Model

4	Chaparral (S)
tu5	Very high load, dry climate timber-shrub (S) (165)

Modules: SURFACE, SCORCH

Description		Sanders-SUMMER

Fuel/Vegetation, Surface/Understory

Fuel Model		gr4, sh1

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	18
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	270
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Notes

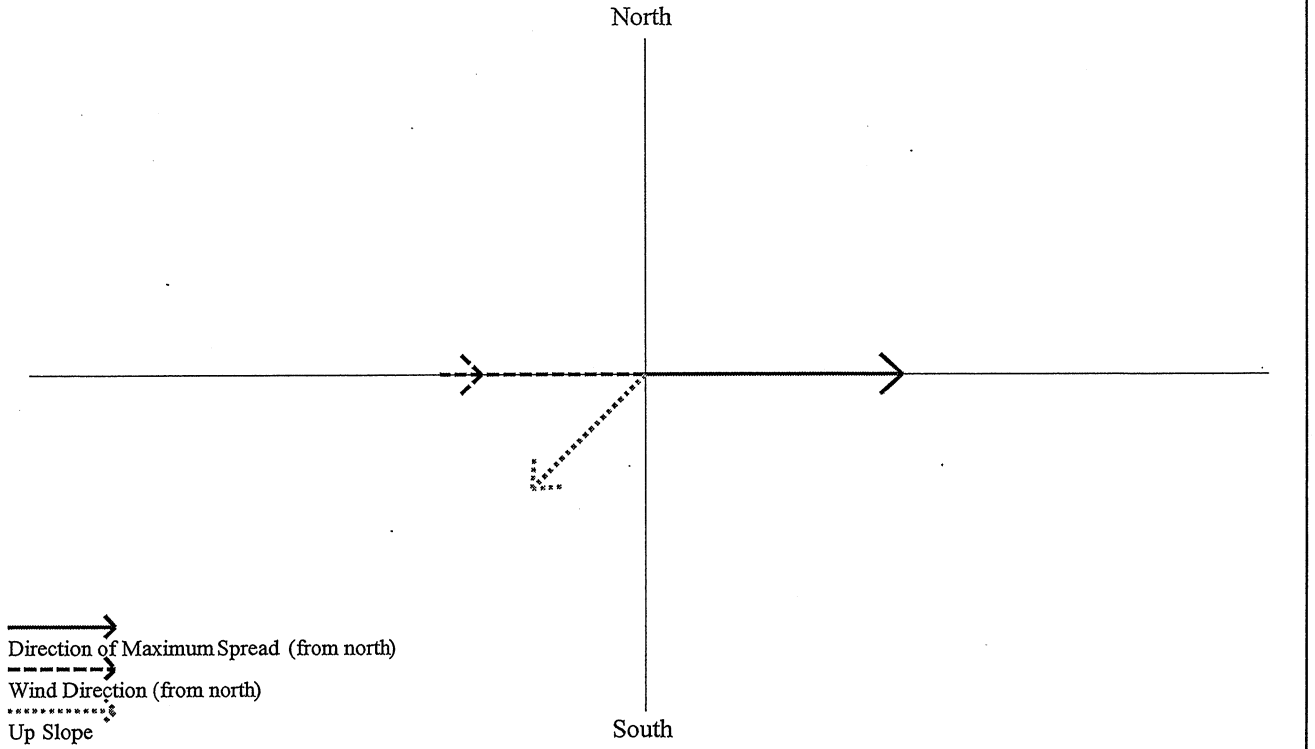
Sanders-SUMMER

Fuel Model	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
gr4	238.6	16.0	90	9.0	0.5	315
sh1	39.3	6.0	90	9.0	0.5	46

Sanders-SUMMER

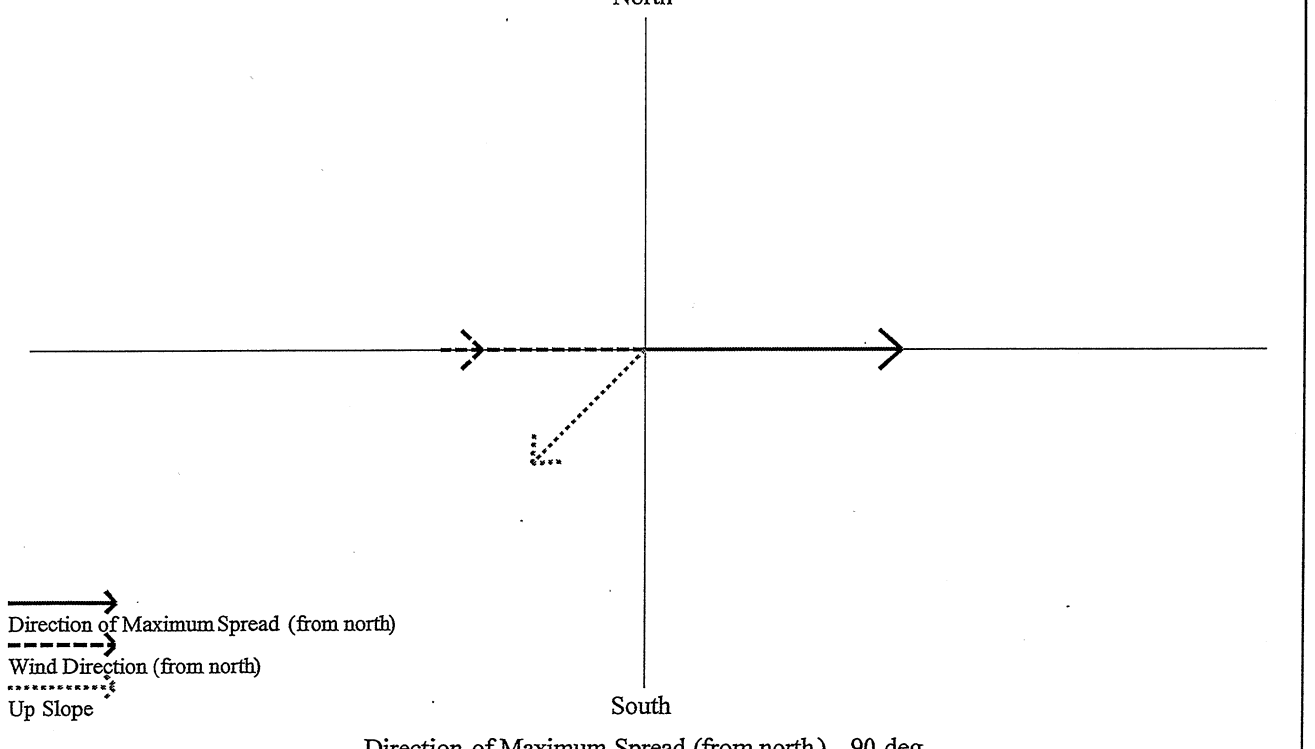
Wind / Slope / Fire Directions

Fuel Model : gr4



Direction of Maximum Spread (from north) 90 deg

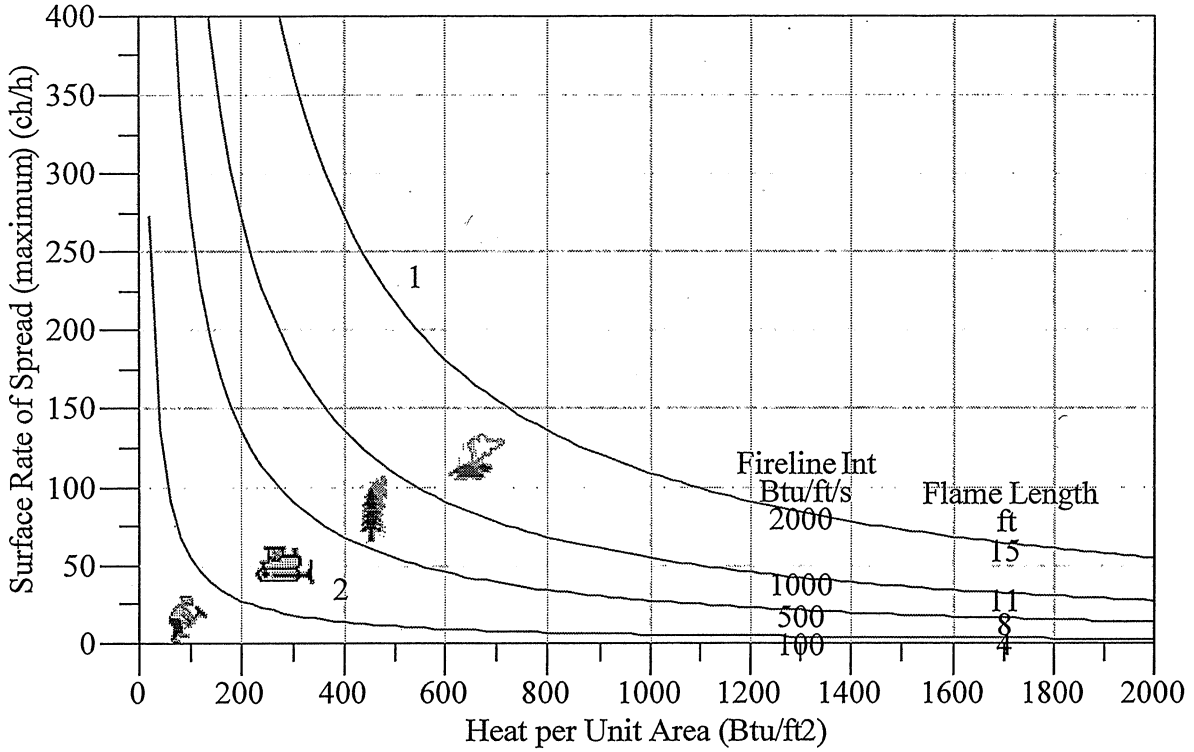
Fuel Model : sh1



Direction of Maximum Spread (from north) 90 deg

Sanders-SUMMER

Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-SUMMER

Fuel Model

gr4	Moderate load, dry climate grass (D) (104)
sh1	Low load, dry climate shrub (D) (141)

Modules: SURFACE, SCORCH

Description		Sanders -SUMMER

Fuel/Vegetation, Surface/Understory

Fuel Model		4, tu5

Fuel Moisture

Dead Fuel Moisture	%	3
Live Fuel Moisture	%	50

Weather

20-ft Wind Speed	mi/h	18
Wind Adjustment Factor		0.5
Wind Direction (from north)	deg	270
Air Temperature	oF	109

Terrain

Slope Steepness	%	0
Aspect (from north)	deg	45

Run Option Notes

Calculations are only for the direction of maximum spread [SURFACE].

Fireline intensity, flame length, and spread distance are always for the direction of the spread calculations [SURFACE].

Wind and spread directions are degrees clockwise from north [SURFACE].

Wind direction is the direction from which the wind is blowing [SURFACE].

Notes

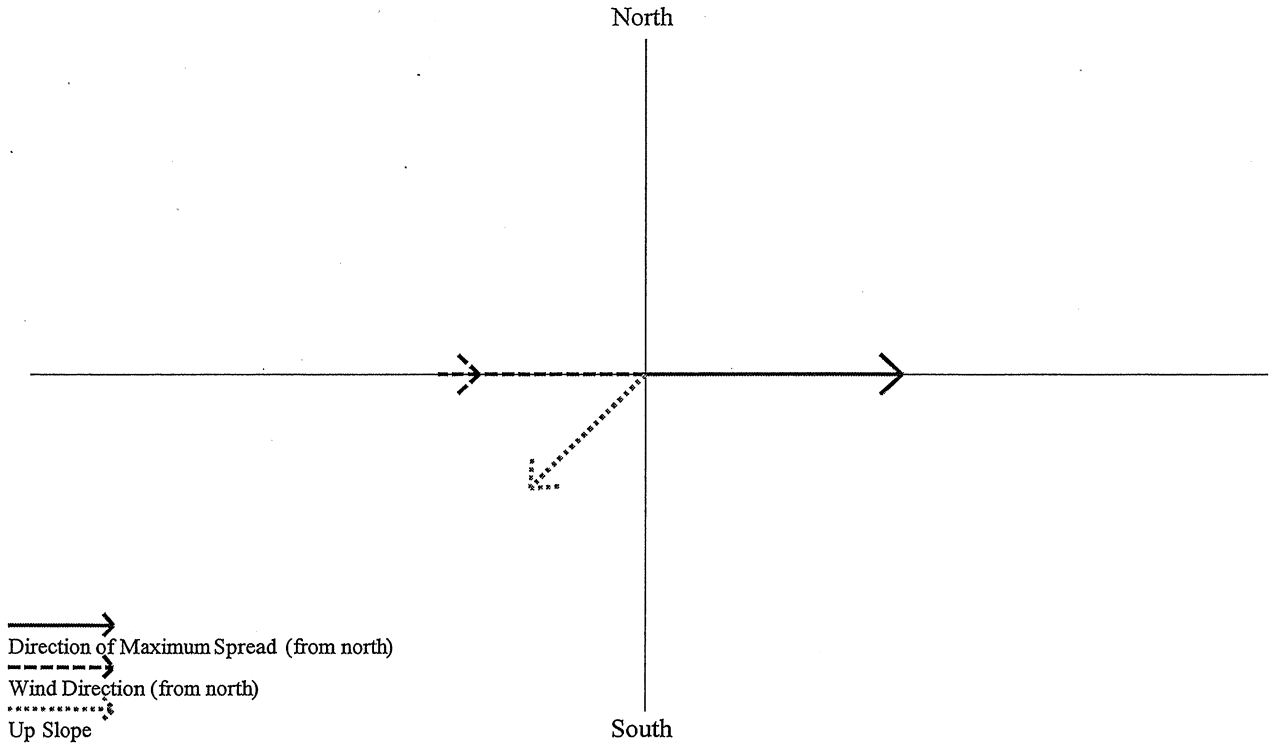
Sanders-SUMMER

Fuel Model	ROS (max) ch/h	Flame Length ft	Direction Max ROS deg	Midflame Wind Speed mi/h	Wind Adj Factor	Scorch Height ft
4	317.5	41.9	90	9.0	0.5	1423
tu5	27.9	13.3	90	9.0	0.5	226

Sanders-SUMMER

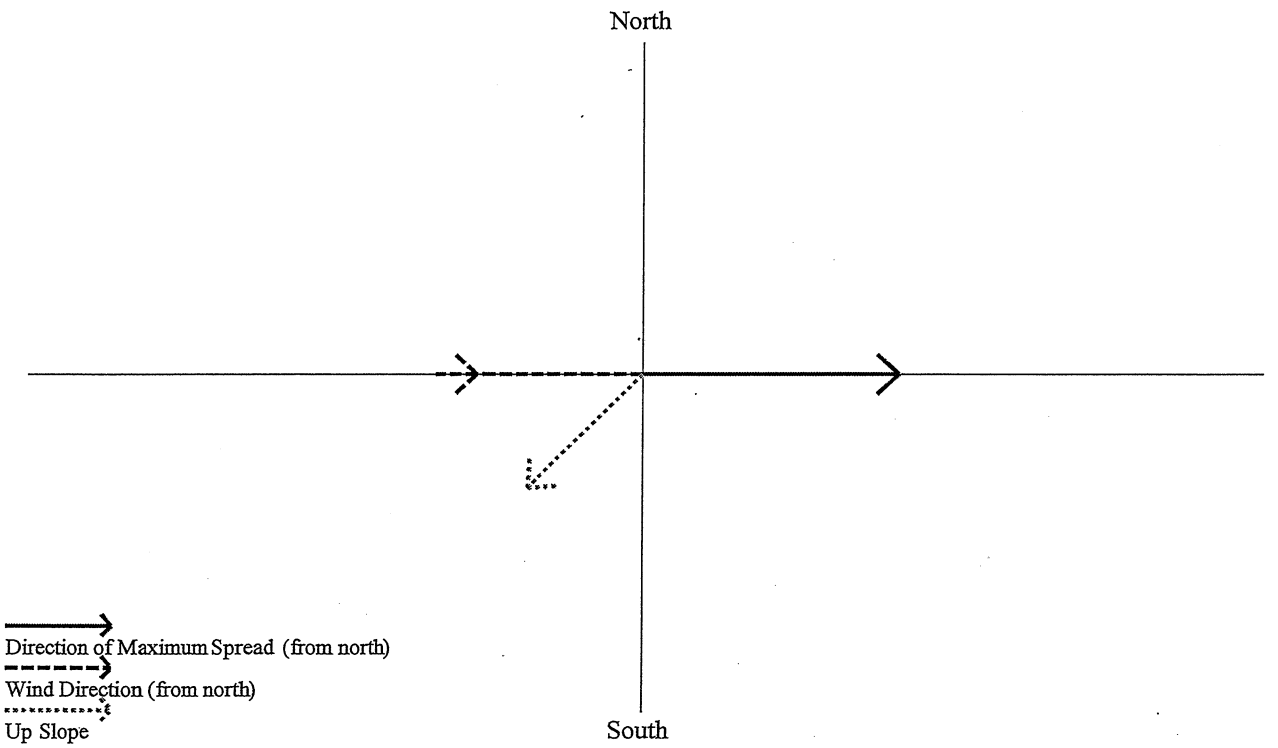
Wind / Slope / Fire Directions

Fuel Model : 4



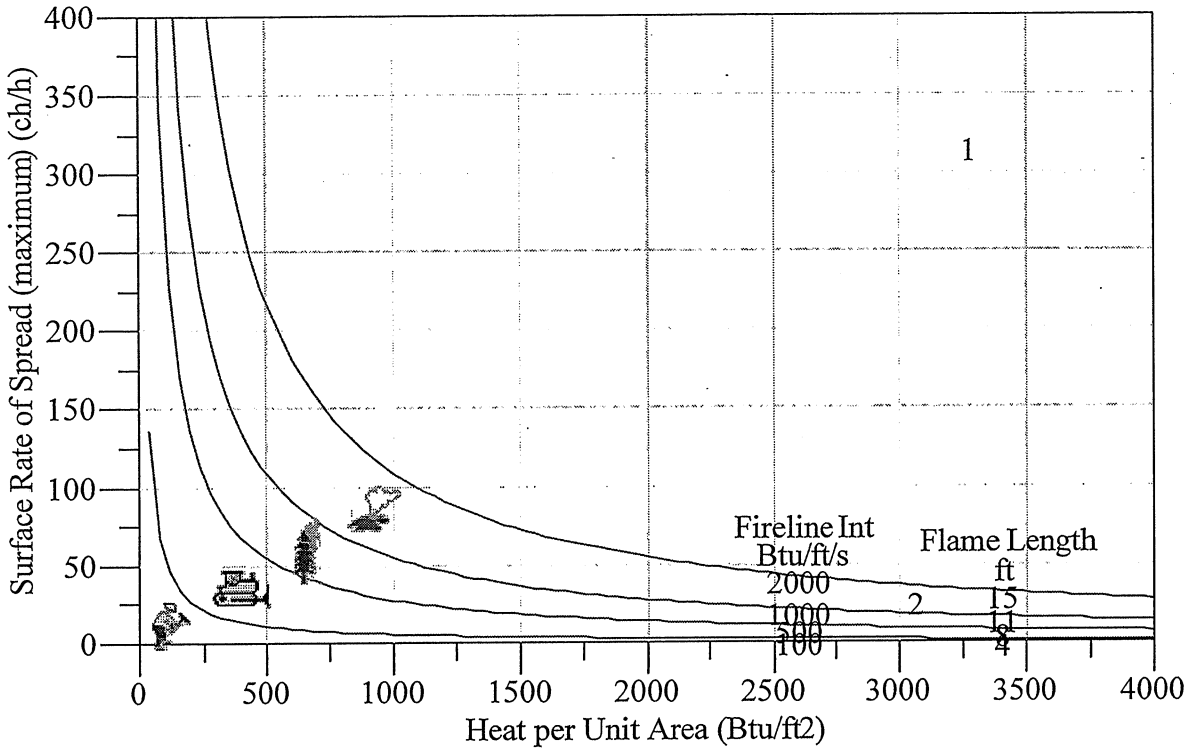
Direction of Maximum Spread (from north) 90 deg

Fuel Model : tu5



Direction of Maximum Spread (from north) 90 deg

Sanders-SUMMER
Fire Characteristics Chart



Discrete Variable Codes Used
Sanders-SUMMER

Fuel Model

4	Chaparral (S)
tu5	Very high load, dry climate timber-shrub (S) (165)

APPENDIX D

COUNTY OF SAN DIEGO'S LIST OF ACCEPTABLE PLANTS

SUGGESTED PLANT LIST FOR A DEFENSIBLE SPACE

BOTANICAL NAME	COMMON NAME	Climate Zone
TREES		
Acer		
platanoides	Norway Maple	M
rubrum	Red Maple	M
saccharinum	Silver Maple	M
saccarum	Sugar Maple	M
macrophyllum	Big Leaf Maple	C/ (R)
Alnus rhombifolia	White Alder	C/I/M (R)
Arbutus		
unedo	Strawberry Tree	All zones
Archontophoenix		
cunninghamiana	King Palm	C
Arctostaphylos spp.**	Manzanita	C/I/D
Brahea		
armata	Blue Hesper Palm	C/D
edulis	Guadalupe Palm	C/D
Ceratonia siliqua	Carob	C/I/D
Cerdidium floridum	Blue Palo Verde	D
Cercis occidentalis**	Western Redbud	C/I/M
Cornus		
nuttallii	Mountain Dogwood	I/M
stolonifera	Redtwig Dogwood	I/M
Eriobotrya		C/I/D
japonica	Loquat	C
Erythrina caffra	Kaffirboom Coral Tree	I/M
Gingko biloba "Fairmount"	Fairmount Maidenhair Tree	I/D/M
Gleditisia triacanthos	Honey Locust	I
Juglans		
californica	California Walnut	C/I
hindsii	California Black Walnut	I/D/M
Lagerstroemia indica	Crape Myrtle	I
Ligustrum lucidum	Glossy Privet	C/I/M
Liquidambar styraciflua	Sweet Gum	I
Liriodendron tulipifera	Tulip Tree	
Lyonothamnus floribundus		C
ssp. Asplenifolius	Fernleaf Catalina Ironwood	C/I/D
Melaleuca spp.	Melaleuca	C/I
Parkinsonia aculeate	Mexican Palo Verde	
Pistacia	Chinese Pistache	
chinensis	Pistachio Nut	C/I/D

vera	Pistachio Nut	I
Pittosporum		
phillyraeoides	Willow Pittosporum	C/I/D
viridiflorum	Cape Pittosporum	C/I
Platanus		
acerifolia	London Plane Tree	All zones
racemosa**	California Sycamore	C/I/M
Populus		
alba	White Poplar	D/M
fremontii**	Western Cottonwood	I
trichocarpa	Black Cottonwood	I/M
Prunus		
xblireiana	Flowering Plum	M
caroliniana	Carolina Laurel Cherry	C
ilicifolia**	Hollyleaf Cherry	C
lyonii**	Catalina Cherry	C
serrulata 'Kwanzan'	Flowering Cherry	M
yedoensis 'Akebono'	Akebono Flowering Cherry	M
Quercus		
agrifolia**	Coast Live Oak	C/I
engelmannii	Engelmann Oak	I
** suber	Cork Oak	C/I/D
Rhus		
lancea**	African Sumac	C/I/D
Salix spp.**	Willow	All zones (R)
Tristania conferta	Brisbane Box	C/I
Ulmus		
parvifolia	Chinese Elm	I/D
pumila	Siberian Elm	C/M
Umbellularia californica**	California Bay Laurel	C/I

SHRUBS		
Agave	Century Plant	D
americana	Century Plant	D
deserti	Shawis Century Plant	D
shawi**		
Amorpha fruticosa**	False Indigobush	I
Arbutus		
menziesii**	Madrone	C/I
Arctostaphylos spp.**	Manzanita	C/I/D
Atriplex**		
canescens	Hoary Saltbush	I
lentiformis	Quail Saltbush	D
Carissa grandiflora	Natal Plum	C/I
Ceanothus spp.**	California Lilac	C/I/M
Cistus spp.	Rockrose	C/I/D
Cneoridium dumosum**	Bushrue	C
Comarostaphylis**		
diversifolia	Summer Holly	C
Convolvulus cneorum	Bush Morning Glory	C/I/M
Dalea		
orcuttii	Orcutt's Delea	D
spinosa**	Smoke Tree	I/D
Elaeagnus		
pungens	Silverberry	C/I/M
Encelia**		
californica	Coast Sunflower	C/I
farinose	White Brittlebush	D/I
Eriobotrya		
deflexa	Bronze Loquat	C/I
Eriophyllum		
confertiflorum**	Golden Yarrow	C/I
staechadifolium	Lizard Tail	C
Escallonia spp.	Escallonia	C/I
Feijoa sellowiana	Pineapple Guava	C/I/D
Fouqueria splendens	Ocotillo	D
Fremontodendron**		
californicum	Flannelbush	I/M
mexicanum	Southern Flannelbush	I
Galvezia		
juncea	Baja Bush-Snapdragon	C
speciosa	Island Bush-Snapdragon	C
Garrya		
elliptica	Coast Silktassel	C/I
flavescens**	Ashy Silktassel	I/M

Heteromeles arbutifolia**	Ashy Silktassel	I/M
Lantana spp.	Toyon	C/I/M
Lotus scoparius	Lantana	C/I/D
Mahonia spp.	Deerweed	C/I
	Barberry	C/I/M
Malacothamnus		
clementinus		
	San Clemente Island Bush Mallow	C
fasciculatus**		
	Mesa Bushmallow	C/I
Melaleuca spp.		
Mimulus spp.**	Melaleuca	C/I/D
Nolina	Monkeyflower	C/I (R)
parryi		
parryi ssp. wolfii	Parry's Nolina	I
Photinia spp.	Wolf's Bear Grass	D
Pittosporum	Photinia	All Zones
crassifolium		
rhombifolium		CI/I
tobira 'Wheeleri'	Queensland Pittosporum	C/I
undulatum	Wheeler's Dwarf	C/I/D
viridiflorum	Victorian Box	C/I
Plumbago auriculata	Cape Pittosporum	C/I
Prunus	Cape Plumbago	C/I/D
caroliniana		
ilicifolia**	Carolina Laurel Cherry	C
lyonii**	Hollyleaf Cherry	C
Puncia granatum	Catalina Cherry	C
Pyracantha spp.	Pomegranate	C/I/D
Quercus	Firethorn	All Zones
dumosa**		
Rhamus	Scrub Oak	C/I
alaternus		
californica**	Italian Blackthorn	C/I
Rhaphiolepis spp.	Coffeeberry	C/I/M
Rhus	Rhaphiolepis	C/I/D
integrifolia**		
laurina	Lemonade Berry	C/I
lentii	Laurel Sumac	C/I
ovata**	Pink-Flowering Sumac	C/D
trilobata**	Sugarbush	I/M
Ribes	squawbush	I
viburnifolium		
speciosum**	Evergreen Currant	C/I
Romneya coulteri	Fuschia-Flowering Gooseberry	C/I/D
Rosa	Matilija Poppy	I
californica**		
minutifolia		

Salvia spp.**	California Wild Rose	C/I
Sambucus spp.**	Baja California Wild Rose	C/I
Symphoricarpos mollis**	Sage	All Zones
Syringa vulgaris	Elderberry	C/I/M
Tecomaria capensis	Creeping Snowberry	C/I
Teucrium fruticans	Lilac	M
Toxicodendron**	Cape Honeysuckle	C/I/D
diversilobum	Bush Germander	C/I
Verbena		
lilacina	Poison Oak	I/M
Xylosma congestum		
Yucca**	Lilac Verbena	C
schidigera	Shiny Xylosma	C/I
whipplei		
	Mojave Yucca	D
	Foothill Yucca	I

GROUNDCOVERS		
Achillea**	Yarrow	All Zones
Aptenia cordifolia	Apteria	C
Arctostaphylos spp.**	Manzanita	C/I/D
Ceanothus spp.**	California Lilac	C/I/M
Cerastium tomentosum	Snow-in-Summer	All Zones
Coprosma kirkii	Creeping Coprosma	C/I/D
Cotoneaster spp.	Redberry	All Zones
Drosanthemum hispidum	Rosea Ice Plant	C/I
Dudleya		
brittonii	Brittonis Chalk Dudleya	C
pulverulenta**	Chalk Dudleya	C/I
virens	Island Live Fore-ever	C
Eschscholzia californica**	California Poppy	All Zones
Euonymus fortunei		
'Carrierei'	Glossy Winter Creeper	M
'Coloratus'	Purple-Leaf Winter Creeper	M
Ferocactus viridescens**	Coast Barrel Cactus	C
Gaillardia grandiflora	Blanket Flower	All Zones
Gazania spp.	Gazania	C/I
Helianthemum spp.**	Sunrose	All Zones
Lantana spp.	Lantana	C/I/D
Lasthenia		
californica**	Common Goldfields	I
glabrata	Coastal Goldfields	C
Lupinus spp.**	Lupine	C/I/M
Myoporum spp.	Myoporum	C/I
Pyracantha spp.	Firethorn	All zones
Rosmarinus officinalis	Rosemary	C/I/D
Santolina		
chamaecyparissus	Lavender Cotton	All Zones
virens	Santolina	All Zones
Trifolium frageriferum	O'Connor's Legume	C/I
Verbena		
rigida	Verbena	All Zones
Viguiera laciniata**	San Diego Sunflower	C/I
Vinca		
minor	Dwarf Periwinkle	M

VINES		
Antigonon leptopus	San Miguel Coral Vine	C/I
Distictis buccinatoria	Blood-Red Trumpet Vine	C/I/D
Keckiella cordifolia**	Heart-Leaved Penstemon	C/I
Lonicera		
japonica 'Halliana'	Hall's Honeysuckle	All Zones
subspicata**	Chaparral Honeysuckle	C/I
Solanum		
jasminoides	Potato Vine	C/I/D

PERENNIALS		
Coreopsis		
gigantean	Giant Coreopsis	C
grandiflora	Coreopsis	All Zones
maritime	Sea Dahlia	C
verticillata	Coreopsis	C/I
Heuchera maxima	Island Coral Bells	C/I
Iris douglasiana**	Douglas Iris	C/M
Iva hayesiana**	Poverty Weed	C/I
Kniphofia uvaria	Red-Hot Poker	C/M
Lavandula spp.	Lavender	All Zones
Limonium californicum		
var. mexicanum	Coastal Statice	C
perezii	Sea Lavender	C/I
Oenothera spp.	Primrose	C/I/M
Penstemon spp.**	Penstemon	C/I/D
Satureja douglasii	Yerba Buena	C/I
Sisyrinchium		
bellum	Blue-Eyed Grass	C/I
californicum	Golden-Eyed Grass	C
Solanum		
xantii	Purple Nightshade	C/I
Zauschneria**		
californica	California Fuschia	C/I
cana	Hoary California Fuschia	C/I
'Catalina'	Catalina Fuschia	C/I

ANNUALS		
Lupinus spp.**	Lupine	C/I/M

APPENDIX E

COUNTY LIST OF UNDESIRABLE PLANTS
AND
CALEPPC LIST

UNDESIRABLE PLANT LIST

The following species are highly flammable and should be avoided when planting within the first 50 feet adjacent to a structure. The plants listed below are more susceptible to burning, due to rough or peeling bark, production of large amounts of litter, vegetation that contains oils, resin, wax, or pitch, large amounts of dead material in the plant, or plantings with a high dead to live fuel ratio. Many of these species, if existing on the property and adequately maintained (pruning, thinning, irrigation, litter removal, and weeding), may remain as long as the potential for spreading a fire has been reduced or eliminated.

BOTANICAL NAME	COMMON NAME
Abies species	Fir Trees
Acacia species	Acacia (trees, shrubs, groundcovers)
*Adenostoma sparsifolium***	Red Shanks
*Adenostoma fasciculatum***	Chamise
Agonis juniperina	Juniper Myrtle
Araucaria species	Monkey Puzzle, Norfolk Island Pine
*Artemesia californica***	California Sagebrush
Bambusa species	Bamboo
Cedrus species	Cedar
Chamaecyparis species	False Cypress
Coprosma pumila	Prostrate Coprosma
Cryptomeria japonica	Japanese Cryptomeria
Cupressocyparis leylandii	Leylandii Cypress
*Cupressus forbesii***	Tecate Cypress
Cupressus glabra	Arizona Cypress
Cupressus sempervirens	Italian Cypress
Dodonea viscosa	Hopseed Bush
*Eriogonum fasciculatum***	Common Buckwheat
Eucalyptus species	Eucalyptus
*Heterotheca grandiflora***	Telegraph Plant
Juniperus species	Junipers
Larix species	Larch
Lonicera japonica	Japanese Honeysuckle
Miscanthus species	Eulalia Grass
*Muehlenbergia species***	Deer Grass
Palmae species	Palms
Picea species	Spruce Trees
*Pickeringia Montana***	Chaparral Pea
Pinus species	Pines
Podocarpus species	Fern Pine
Pseudotsuga menziesii	Douglas Fir
Rosmarinus species	Rosemary
*Salvia mellifera***	Black Sage
Taxodium species	Cypress
Taxus species	Yew
Thuja species	Arborvitae
Tsuga species	Hemlock
*Urtica urens***	Burning Nettle

** San Diego County native species

References: Gordon, H. White, T.C. 1994. Ecological Guide to Southern California Chaparral Plant Series. Cleveland National Forest.

Willis, E. 1997. San Diego County Fire Chief's Association. Wildland/Urban Interface Development Standards

City of Oceanside, California. 1995. Vegetation Management. Landscape Development Manual. Community Services Department, Engineering Division.

City of Vista, California 1997. Undesirable Plants. Section 18.56.999. Landscaping Design, Development and Maintenance Standards.

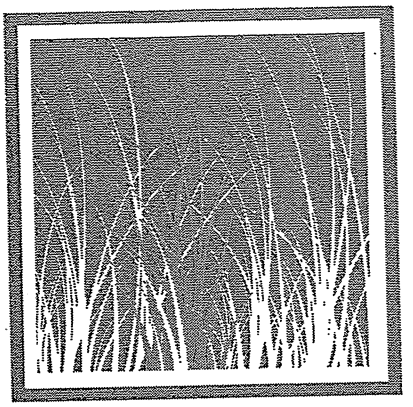
www.bewaterwise.com. 2004. Fire-resistant California Friendly Plants.

www.ucfpl.ucop.edu. 2004. University of California, Berkeley, Forest Products Laboratory, College of Natural Resources. Defensible Space Landscaping in the Urban/Wildland Interface. A Compilation of Fire Performance Ratings of Residential Landscape Plants.

County of Los Angeles Fire Department. 1998. Fuel Modification Plan Guidelines. Appendix I, Undesirable Plant List, and Appendix II, Undesirable Plant List.

The CalEPPC List:
Exotic Pest Plants of Greatest Ecological Concern in California

October, 1999



The CalEPPC list is based on information submitted by our members and by land managers, botanists and researchers throughout the state, and on published sources. The list highlights non-native plants that are serious problems **in wildlands** (natural areas that support native ecosystems, including national, state and local parks, ecological reserves, wildlife areas, national forests, BLM lands, etc.).

List categories include:

List A: Most Invasive Wildland Pest Plants; documented as aggressive invaders that displace natives and disrupt natural habitats. Includes two sub-lists; List A-1: Widespread pests that are invasive in more than 3 Jepson regions (see page 3), and List A-2: Regional pests invasive in 3 or fewer Jepson regions.

List B: Wildland Pest Plants of Lesser Invasiveness; invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption; may be widespread or regional.

Red Alert: Pest plants with potential to spread explosively; infestations currently small or localized. If found, alert CalEPPC, County Agricultural Commissioner or California Department of Food and Agriculture.

Need More Information: Plants for which current information does not adequately describe nature of threat to wildlands, distribution or invasiveness. Further information is requested from knowledgeable observers.

Annual Grasses: New in this edition; a preliminary list of annual grasses, abundant and widespread in California, that pose significant threats to wildlands. Information is requested to support further definition of this category in next List edition.

Considered But Not Listed: Plants that, after review of status, do not appear to pose a significant threat to wildlands.

Plants that fall into the following categories are not included in the List:

- Plants found mainly or solely in disturbed areas, such as roadsides and agricultural fields.
- Plants that are established only sparingly, with minimal impact on natural habitats.

The CalEPPC list is updated regularly. Please use the form provided to send comments, suggestions or new information to: **Peter Warner, 555 Magnolia Avenue, Petaluma, CA, 94952-2080** or via email at **peterjwarner@earthlink.net**

Thanks to all those who submitted comments for the 1999 list.

List A-1: Most Invasive Wildland Pest Plants; Widespread

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ammophila arenaria	European beach grass	Coastal dunes	SCo,CCo,NCo
Arundo donax	giant reed, arundo	Riparian areas	cSNF,CCo,SCo,SnGb,D,GV
Bromus tectorum	cheat grass, downy brome	Sagebrush, pinyon-juniper, other desert communities; increases fire frequency	GB,D
Carpobrotus edulis	iceplant, sea fig	Many coastal communities, esp. dunes	SCo,CCo,NCo,SnFrB
Centaurea solstitialis[C]	yellow starthistle	Grasslands	CA-FP (uncommon in SoCal)
Cortaderia jubata	Andean pampas grass, jubatagrass	Horticultural; many coastal habitats, esp. disturbed or exposed sites incl. logged areas	NCo,NCoRO,SnFrB, CCo,WTR,SCo
Cortaderia selloana	pampas grass	Horticultural; coastal dunes, coastal scrub, Monterey pine forest, riparian, grasslands; wetlands in ScV; also on serpentine	SnFrB,SCo,CCo,ScV
Cynara cardunculus[B]	artichoke thistle	Coastal grasslands	CA-FP, esp. CCo,SCo
Cytisus scoparius[C]	Scotch broom	Horticultural; coastal scrub, oak woodlands, Sierra foothills	NW,CaRF,SNF,GV, SCo,CW
Eucalyptus globulus	Tasmanian blue gum	Riparian areas, grasslands, moist slopes	NCoRO,GV,SnFrB, CCo,SCoRO,SCo,nChI
Foeniculum vulgare	wild fennel	Grasslands; esp. SoCal, Channel Is.; the cultivated garden herb is not invasive	CA-FP
Genista monspessulana[C]	French broom	Horticultural; coastal scrub, oak woodlands, grasslands	NCoRO,NCoRI,SnFrB, CCo,SCoRO,sChI,WTR,PR
Lepidium latifolium[B]	perennial pepperweed, tall whitetop	Coastal, inland marshes, riparian areas, wetlands, grasslands; potential to invade montane wetlands	CA (except KR,D)
Myriophyllum spicatum	Eurasian watermilfoil	Horticultural; lakes, ponds, streams, aquaculture	SnFrB,SnJV,SNH(?); prob. CA
Pennisetum setaceum	fountain grass	Horticultural; grasslands, dunes, desert canyons; roadsides	Deltaic GV,CCo,SCo, SnFrB
Rubus discolor	Himalayan blackberry	Riparian areas, marshes, oak woodlands	CA-FP
Senecio mikanioides (=*Delairea odorata*)	Cape ivy, German ivy	Coastal, riparian areas, also SoCal (south side San Gabriel Mtns.)	SCo,CCo,NCo,SnFrB,SW
Taeniatherum caput-medusae[C]	medusa-head	Grasslands, particularly alkaline and poorly drained areas	NCoR,CaR,SNF,GV,SCo
Tamarix chinensis, T. gallica, T. parviflora & T. ramosissima	tamarisk, salt cedar	Desert washes, riparian areas, seeps and springs	SCo,D,SnFrB,GV,sNCoR, sSNF,Teh,SCoRI,SNE, WTR
Ulex europaeus[B]	gorse	North, central coastal scrub, grasslands	NCo,NCoRO,CaRF, n&cSNF,SnFrB,CCo

[1]Noxious Weed Ratings

F: Federal Noxious Weed, as designated by the USDA; targeted for federally-funded prevention, eradication or containment efforts.

A: CA Dept. of Food & Agriculture, on "A" list of Noxious Weeds; agency policies call for eradication, containment or entry refusal.

B: CA Dept. of Food & Agriculture, on "B" list of Noxious Weeds; includes species that are more widespread, and therefore more difficult to contain; agency allows county Agricultural Commissioners to decide if local eradication or containment is warranted.

C: CA Dept. of Food & Agriculture, on "C" list of Noxious Weeds; includes weeds that are so widespread that the agency does not endorse state or county-funded eradication or containment efforts except in nurseries or seed lots.

Q: CA Dept. of Food & Agriculture's designation for temporary "A" rating pending determination of a permanent rating.

For most species nomenclature follows *The Jepson Manual: Higher Plants of California* (Hickman, J., Ed., 1993).

List A-2: Most Invasive Wildland Pest Plants; Regional

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ailanthus altissima	tree of heaven	Riparian areas, grasslands, oak woodlands, esp. GV, SCo	CA-FP
Atriplex semibaccata	Australian saltbush	SoCal, coastal grasslands, scrub, "high marsh" of coastal salt marshes	CA (except CaR,c&sSN)
Brassica tournefortii	Moroccan or African mustard	Washes, alkaline flats, disturbed areas in Sonoran Desert	SW,D
Bromus madritensis ssp. *rubens*	red brome	Widespread; contributing to SoCal scrub, desert scrub type conversions; increases fire frequency	CA
Cardaria draba[B]	white-top, hoary cress	Riparian areas, marshes of central coast; also ag. lands, disturbed areas	Problem only in CCo
Conicosia pugioniformis	narrow-leaved iceplant, roundleaf iceplant	Coastal dunes, sandy soils near coast; best documented in San Luis Obispo and Santa Barbara cos.	CCo
Cotoneaster pannosus, *C. lacteus*	cotoneaster	Horticultural; many coastal communities; esp. North Coast, Big Sur; related species also invasive	CCo,SnFrB,NW
Cytisus striatus	striated broom	Often confused with C. scoparius; coastal scrub, grassland	SnFrB,CCo,SCo,PR
Egeria densa	Brazilian waterweed	Streams, ponds, sloughs, lakes; Sacramento-San Joaquin Delta	n&sSNF,SnJV,SnFrB, SnJt,SNE
Ehrharta calycina	veldt grass	Sandy soils, esp. dunes; rapidly spreading on central coast	CCo,SCoRO,WTR
Eichhornia crassipes	water hyacinth	Horticultural; established in natural waterways, esp. troublesome in Sacramento-San Joaquin Delta	GV,SnFrB,SCo,PR
Elaeagnus angustifolia	Russian olive	Horticultural; interior riparian areas	SnJV,SnFrB,SNE,DMoj
Euphorbia esula[A]	leafy spurge	Rangelands in far no. CA, also reported from Los Angeles Co.	eKR,NCo,CaR,MP,SCo
Ficus carica	edible fig	Horticultural; Central Valley, foothill, South Coast and Channel Is. riparian woodlands	nSNF,GV,SnFrB,SCo
Lupinus arboreus	bush lupine	Native to SCo, CCo; invasive only in North Coast dunes	SCo,CCo,NCo
Mentha pulegium	pennyroyal	Santa Rosa Plain (Sonoma Co.) and Central Valley vernal pools; wetlands elsewhere	NW,GV,CW,SCo
Myoporum laetum	myoporum	Horticultural; coastal riparian areas in SCo	SCo,CCo
Saponaria officinalis	bouncing bet	Horticultural; meadows, riparian habitat in SNE, esp. Mono Basin	NW,CaRH,nSNF,SnFrB, SCoRO,SCo,PR,MP,SNE, GV
Spartina alterniflora	Atlantic or smooth cordgrass	S.F. Bay salt marshes; populations in Humboldt Bay believed extirpated	CCo(shores of S.F. Bay)

[2]Distribution by geographic subdivisions per the Jepson Manual

CA=California
CA-FP=California Floristic Province
CaR=Cascade Ranges
CaRF=Cascade Range Foothills
CCo=Central Coast
ChI=Channel Islands
CW=Central Western CA
D=Deserts
DMoj=Mojave Desert
DSon=Sonoran Desert
GB=Great Basin
GV=Great Valley
KR=Klamath Ranges
MP=Modoc Plateau
NCo=North Coast
NCoRI=Inner NCo Ranges
NCoRO=Outer NCo Ranges
NW=Northwestern CA
PR=Peninsular Ranges
SCo=South Coast
SCoRI=Inner SCo Ranges
SCoRO=Outer SCo Ranges
ScV=Sacramento Valley
SnJV=San Joaquin Valley
SN=Sierra Nevada
SNE=East of SN
SNF=SN Foothills
SNH=High SN
SnFrB=San Francisco Bay Area
SnGb=San Gabriel Mtns
SW=Southwestern CA
Teh=Tehachapi Mtns
WTR=Western Transverse Ranges

List B: Wildland Pest Plants of Lesser Invasiveness

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution
Ageratina adenophora[F]	eupatory	Horticultural; coastal canyons, coastal scrub, slopes, Marin to San Diego Co; San Gabriel Mtns.	CCo,SnFrB,SCo,SCoRO
Bassia hyssopifolia	bassia	Alkaline habitats	CA (except NW,SNH)
Bellardia trixago	bellardia	Grasslands, on serpentine, where a threat to rare natives	NCoRO,CCo,SnFrB
Brassica nigra	black mustard	Coastal communities, esp. fog-belt grasslands; disturbed areas	CA-FP
Cardaria chalepensis[B]	lens-podded white-top	Wetlands of Central Valley	CA
Carduus pycnocephalus[C]	Italian thistle	Grasslands, shrublands, oak woodlands	sNCo,sNCoR,SNF,CW, SCo,ScV
Centaurea calcitrapa[B]	purple starthistle	Grasslands	NW,sCaRF,SNF,GV,CW,SW
Centaurea melitensis	tocalote, Malta starthistle	Widespread; sometimes misidentified as C. solstitialis; perhaps a more serious invader than currently recognized	CA-FP,D
Cirsium arvense[B]	Canada thistle	Especially troublesome in riparian areas	CA-FP
Cirsium vulgare	bull thistle	Riparian areas, marshes, meadows	CA-FP,GB
Conium maculatum	poison hemlock	Mainly disturbed areas but may invade wildlands; known to poison wildlife; early expanding stage in many areas, esp. San Diego Co. riparian, oak understory	CA-FP
Crataegus monogyna	hawthorn	Horticultural; recent invader, colonizing healthy native forest around Crystal Springs reservoir on S.F. peninsula	SnFrB,CCo,NCo,NCoR
Ehrharta erecta	veldt grass	Wetlands, moist wildlands; common in urban areas; potential to spread rapidly in coastal, riparian, grassland habitats	SnFrB,CCo,SCo
Erechtites glomerata, E. minima	Australian fireweed	Coastal woodlands, scrub, NW forests, esp. redwoods	NCo,NCoRO,CCo,SnFrB, SCoRO
Festuca arundinacea	tall fescue	Horticultural (turf grass); coastal scrub, grasslands in NCo, CCo	CA-FP
Hedera helix	English ivy	Horticultural; invasive in coastal forests, riparian areas	CA-FP
Holcus lanatus	velvet grass	Coastal grasslands, wetlands in No. CA	CA exc. DSon
Hypericum perforatum[C]	Klamathweed, St. John's wort	Redwood forests, meadows, woodlands; invasion may occur due to lag in control by established biocontrol agents	NW,CaRH,n&cSN,ScV, CCo,SnFrB,PR
Ilex aquifolium	English holly	Horticultural; coastal forests, riparian areas	NCoRO,SnFrB,CCo
Iris pseudacorus	yellow water iris, yellow flag	Horticultural; riparian, wetland areas, esp. San Diego, Los Angeles cos.	SnFrB,CCo,sSnJV,SCo
Leucanthemum vulgare	ox-eye daisy	Horticultural; invades grassland, coastal scrub	KR,NCoRO,n&cSNH, SnFrB,WTR,PR
Mesembryanthemum crystallinum	crystalline iceplant	Coastal bluffs, dunes, scrub, grasslands; concentrates salt in soil	NCo,CCo,SCo,ChI
Myriophyllum aquaticum	parrot's feather	Horticultural; streams, lakes, ponds	NCo,CaRF,CW,SCo
Olea europaea	olive	Horticultural and agricultural; reported as invasive in riparian habitats in Santa Barbara, San Diego	NCoR,NCoRO,CCo, SnFrB,SCoRO,SCo
Phalaris aquatica	Harding grass	Coastal sites, esp. moist soils	NW,cSNF,CCo,SCo
Potamogeton crispus	curlyleaf pondweed	Scattered distribution in ponds, lakes, streams	NCoR,GV,CCo,SnFrB, SCo,ChI,SnGb,SnBr,DMoj
Ricinus communis	castor bean	SoCal coastal riparian habitats	GV,SCo,CCo
Robinia pseudoacacia	black locust	Horticultural; riparian areas, canyons; native to eastern U.S.	CA-FP,GB
Schinus molle	Peruvian pepper tree	Horticultural; invasive in riparian habitats in San Diego, Santa Cruz Is.	SNF,GV,CW,SW,Teh

List B: Continued

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Schinus terebinthifolius	Brazilian pepper	Horticultural; riparian areas	sSCo
Senecio jacobaea[B]	tansy ragwort	Grasslands; biocontrol agents established	NCo,wKR,s&wCaR, nSNF, nScV,SW
Spartium junceum	Spanish broom	Coastal scrub, grassland, wetlands, oak woodland, NW forests, esp. redwoods; also roadcuts	NCoRO,ScV,SnFrB, SCoRO,SCo,sChI,WTR
Verbascum thapsus	woolly or common mullein	SNE meadows, sagebrush, pinyon-juniper woodlands; shores of Boggs Lake (Lake Co.)	CA
Vinca major	periwinkle	Horticultural; riparian, oak woodland, other coastal habitats	NCoRO,SnFrB, CCo, sSCoRO,SCo

Red Alert: Species with potential to spread explosively; infestations currently restricted

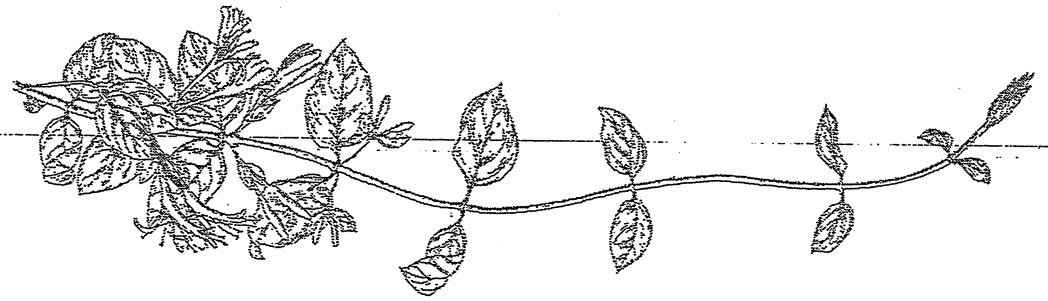
Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Alhagi pseudalhagi[A]	camel thorn	Noxious weed of arid areas; most infestations in California have been eradicated	GV,sSNE,D
Arctotheca calendula[A]	Capeweed	Seed-producing types are the problem; most are vegetative only	NCo,SnFrB,CCo
Centaurea maculosa[A]	spotted knapweed	Riparian, grassland, wet meadows, forest habitats; contact CA Food & Ag if new occurrences found	CaR,SN,nScV,nCW,MP, nSNE,sPR,NW
Crupina vulgaris[F,A]	bearded creeper, common crupina	Aggressively moving into wildlands, esp. grassland habitats	NCoR (Sonoma Co.),MP
Halogeton glomeratus[A]	halogeton	Noxious weed of Great Basin rangelands; report locations to CA Food & Ag; goal is exclusion from CA	GB
Helichrysum petiolare	licorice plant	North coastal scrub; one population on Mt. Tamalpais, w. Marin Co.	Not in Jepson
Hydrilla verticillata[F,A]	hydrilla	Noxious water weed; report locations to CA Food & Ag; eradication program in place; found in Clear Lake (Lake Co.) in 1994	NCoRI,n&cSNF,ScV,SCo,D
Lythrum salicaria[B]	purple loosestrife	Horticultural; noxious weed of wetlands, riparian areas	sNCo,NCoRO,nSNF,ScV, SnFrB,nwMP
Ononis alopecuroides[Q]	foxtail restharrow	Eradication efforts underway in San Luis Obispo Co.; to be looked for elsewhere in CA	CCo; not in Jepson
Retama monosperma	bridal broom	First noted at Fallbrook Naval Weapons Station, San Diego Co; could rival other invasive brooms	San Diego Co.; not in Jepson
Salvinia molesta[F]	giant waterfern	Ponds, lakes, reservoirs, canals	Napa, Sonoma cos., lower Colorado River; not in Jepson
Sapium sebiferum	Chinese tallow tree	Horticultural; riparian, wetland habitats, open areas and understory	ScV,SnFrB; not in Jepson
Sesbania punicea	scarlet wisteria tree	Horticultural; riparian areas; American River Parkway, Sacramento Co., Suisun Marsh, San Joaquin River Parkway	ScV,SnJV; not in Jepson
Spartina anglica	cord grass	Scattered in S.F. Bay	Not in Jepson
Spartina densiflora	dense-flowered cord grass	Scattered in S.F. Bay, Humboldt Bay salt marshes	CCo,NCo
Spartina patens	salt-meadow cord grass	One site in S.F. Bay, also Siuslaw Estuary, OR and Puget Sound, WA	CCo

Need More Information

Latin Name	Common Name	Habitats of Concern and Other Comments	Distribution
Acacia dealbata	silver wattle	Aggressive in natural areas?	SnFRB,SCoRO,SCoRI,CCo
Acacia decurrens	green wattle	Sometimes confused with A. dealbata; aggressive in natural areas?	Unknown
Acacia melanoxylon	blackwood acacia	Reported from S.F. Bay area, central coast, Santa Cruz Is.; spreads slowly; other areas?	SnFrB,SCoRO,SCo,CCo
Aeschynomene rudis[B]	rough jointvetch	Princeton area, Colusa Co.; pest of rice crops; potential threat to riparian, wetland habitats?	ScV
Agrostis avenacea	Pacific bentgrass	Invading vernal pools in San Diego area; attempts at manual eradication unsuccessful so far; problem in other areas?	sNCo,sNCoR,SNF, GV,CW,nSCo
Aptenia cordifolia	red apple	Habitats where invasive?	CCo,SCo,sChI
Asphodelus fistulosus	asphodel	Common in SCo highway rights-of-way, other disturbed sites; threats to wildlands?	sSnJV,SCo
Carduus acanthoides[A]	giant plumeless thistle	Threatens wildlands?	NCoRI,nSN,SnFrB, nSCoRO,MP
Cistus ladanifer	gum cistus	Horticultural; invades coastal sage scrub, chaparral; areas where problematic?	sCCo,SnGb
Cordyline australis	New Zealand cabbage	Infestation at Salt Point State Park; bird-dispersed; other problem areas?	Not in Jepson
Cotoneaster spp. (exc. C. pannosus, C. lacteus)	cotoneaster	Horticultural; bird-distributed; which species are problems in wildlands?	Unknown
Cupressus macrocarpa	Monterey cypress	Native only to Monterey Peninsula; planted and naturalized CCo, NCo; threat to wildlands?	CCo
Descurainia sophia	flixweed, tansy mustard	Entering Mojave wildlands through washes; threat to wildlands?	CA
Dimorphotheca sinuata	African daisy, Cape marigold	Horticultural; reported as invasive in w. Riverside Co., Ventura Co.; problem elsewhere?	SnJV,SCoRO,SCo,PR
Echium candicans, E. pininana	pride of Madeira, pride of Teneriffe	Horticultural; riparian, grassland, coastal scrub communities; spreads by seed	CCo,SnFrB,SCo,sNCo
Ehrharta longiflora	veldt grass	Reported from San Diego	Not in Jepson
Erica lusitanica	heath	Threat to wildlands?	NCo (Humboldt Co.)
Euphorbia lathyris	caper spurge, gopher plant	Invades coastal scrub, marshes, dunes; Sonoma, Marin cos.; threat to wildlands?	NCo,CCo,GV,SCo
Gazania linearis	gazania	Horticultural; invades grassland in S.F., coastal scrub?	CCo,SCo
Glyceria declinata		Although reported from Central Valley vernal pools, genetic research is needed to confirm identity; plants that have been called G. declinata key in Jepson to native G. occidentalis	Uncertain; not in Jepson
Hedera canariensis	Algerian ivy	Horticultural; invasive in riparian areas in SoCal?	Not in Jepson
Hirschfeldia incana	Mediterranean or short-pod mustard	Increasing in western, southern Mojave; threat to wildlands?	NCo,SNF,GV,CW,SCo, DMoj
Hypericum canariense	Canary Island hypericum	Reported in San Diego area, coastal sage scrub, grassland; threat to wildlands?	SCo
Hypochaeris radicata	rough cat's-ear	Widespread in coastal grasslands, wetlands; threat to wildlands?	NW,CaRF,nSNF,ScV, CW,SCo
Isatis tinctoria[B]	dyers' woad	Well-known invader in Utah; threat to wildlands?	KR,CaR,nSNH,MP
Ligustrum lucidum	glossy privet	Horticultural; spreading rapidly on Mendocino coast; problem in other areas?	NCo; not in Jepson
Limonium ramosissimum ssp. provinciale	sea lavender	Reported spreading in Carpinteria Salt Marsh; problem in other areas?	Not in Jepson

Need More Information: Continued

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Ludwigia uruguayensis (= *L. hexapetala*)	water primrose	Invasive in aquatic habitats; non-native status questioned?	NCo,sNCoRO,CCo, SnFrB,SCo
Malephora crocea	ice plant	Invades margins of wetlands, bluffs along SCo	CCo,SCo,sChI
Maytenus boaria	mayten	Horticultural; scattered in riparian forests, ScV; east SnFrB	ScV,SnFrB
Mesembryanthemum nodiflorum	slender-leaved iceplant	Abundant on Channel Islands; invades wetlands; habitats where problematic?	SnFrB,SCo,ChI
Nicotiana glauca	tree tobacco	Disturbed places; not very competitive with natives in coastal scrub, chaparral; spreading along Putah Creek (Yolo Co.); problems elsewhere?	NCoRI,c&sSNF, GV,CW,SW,D
Oxalis pes-caprae	Bermuda buttercup	Invades disturbed sites; invasive in undisturbed habitats?	NCo,NCoRO,CCo, SnFrB,SCoRO,SCo
Parentucellia viscosa		Threat to NCo (Humboldt Co.) dune swales?	NCo,NCoRO,CCo,SCo
Passiflora caerulea		Horticultural; reported from SoCal; threat to wildlands?	SCo; not in Jepson
Pennisetum clandestinum[F,C]	Kikuyu grass	Disturbed sites, roadsides; threat to wildlands?	NCo,CCo,SnFrB,SCo, Santa Cruz Is.
Phyla nodiflora	mat lippia	Most varieties in CA are native; taxonomy unclear; status of plants in vernal pools, wetlands?	NW(except KR,NCoRH), GV,CCo,SnFrB,SCo, PR,DSon
Pinus radiata cultivars	Monterey pine	Cultivars invading native Monterey, Cambria forests, where spread of pine pitch canker is a concern	CCo
Piptatherum miliaceum	smilo grass	Aggressive in SoCal creeks, canyons; threats to wildlands?	NCo,GV,CW,SCo
Pistacia chinensis	Chinese pistache	Horticultural; invades riparian areas and woodlands in ScV	ScV
Prunus cerasifera	cherry plum	Oak woodland, riparian areas; esp. Marin, Sonoma cos.; bird-distributed; problems elsewhere?	SnFrB,CCo
Pyracantha angustifolia	pyracantha	Horticultural; spreads from seed in S.F. Bay area; bird-distributed; problem elsewhere?	sNCoRO,CCo,SnFrB, SCo
Salsola soda	glasswort	Threat to salt marshes?	nCCo,SnFrB
Salsola tragus[C]	Russian thistle, tumbleweed	Abundant in dry open areas in w. Mojave Desert, Great Basin; not limited to disturbed sites; threats?	CA
Salvia aethiopis[B]	Mediterranean sage	Creates monocultures in E. Oregon grasslands; threat to CA wildlands?	MP
Stipa capensis		Distribution and threats?	Not in Jepson
Tamarix aphylla	athel	Spreading in Salton Sea area; threats to wildlands?	nSnJV,nSCo,D
Tanacetum vulgare	common tansy	Jepson reports as uncommon, escape from cultivation in urban areas; problem in wildlands?	NCo,NCoRO,CaRH, SCoRO
Verbena bonariensis, *V. litoralis*	tall vervain	Horticultural; invades riparian forests, wetlands; extensive along ScV riparian corridors; roadsides (Yuba Co.); elsewhere?	ScV,nSnJV,nSnFrB,CCo



Annual Grasses

Latin Name[1]	Common Name	Habitats of Concern and Other Comments	Distribution[2]
Aegilops triuncialis[B]	barbed goatgrass	Serpentine soils, grasslands	sNCoR,CaRF, n&cSNF, ScV,nCW
Avena barbata	slender wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub, disturbed sites	CA-FP,MP,DMoj
Avena fatua	wild oat	Lower elev. in SoCal; coastal slopes, coastal sage scrub on deeper soil, disturbed sites	CA-FP,MP,DMoj
Brachypodium distachyon	false brome	Expanding in SoCal; common in Orange Co.	sNCoR,sCaRF, SNF,GV,CW,SCo,sChI
Bromus diandrus	ripgut brome	Coastal dunes, coastal sage scrub, grasslands	CA
Lolium multiflorum	Italian ryegrass	Wetland areas, esp. vernal pools in San Diego Co.; common in disturbed sites	CA-FP
Schismus arabicus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,CW,sChI,D
Schismus barbatus	Mediterranean grass	Threat to Mojave and Colorado desert shrublands?	SnJV,SW,D

Considered, but not listed

Latin Name[1]	Common Name	Habitats of Concern and Other Comments
Albizia lophantha	plume acacia	Not invasive
Anthoxanthum odoratum	sweet vernal grass	Disturbed sites on coast; Marin, Sonoma, Mendocino cos.
Carpobrotus chilensis	sea fig	Native status in question; not a threat to wildlands
Centranthus ruber	red valerian	Horticultural; roadcuts in Marin Co.; not a threat to wildlands
Convolvulus arvensis[C]	field bindweed	Disturbed sites; ag lands
Coprosma repens	mirror plant	No evidence of wildland threat
Crocosmia x crocosmiiflora		Generally in disturbed coastal, urban areas, roadsides
Digitalis purpurea	foxglove	Horticultural; scattered in prairies, meadows, disturbed sites; not a major wildland threat
Dipsacus sativus, D. fullonum	wild teasel, Fuller's teasel	Roadsides, disturbed sites
Fumaria officinalis, F. parviflora	fumitory	S.F. Bay area, Monterey Bay salt marshes, sandy disturbed sites
Medicago polymorpha	California bur clover	Grasslands, moist sites; mainly restricted to disturbed sites
Melilotus officinalis	yellow sweet clover	Restricted to disturbed sites in CA
Nerium oleander	oleander	Horticultural; not invasive, although reported from riparian areas in Central Valley, San Bernardino Mtns.
Picris echioides	bristly ox-tongue	Disturbed areas
Silybum marianum	milk thistle	Disturbed areas, especially overgrazed moist pasturelands; may interfere with restoration
Xanthium spinosum	spiny cocklebur	Identified as native in *The Jepson Manual* (Hickman, 1993) and *A California Flora* (Munz and Keck, 1968); restricted to disturbed areas
Zantedeschia aethiopica	calla lily	Horticultural; mainly a garden escape in wet coastal areas
Zoysia cultivars	Amazoy and others	Horticultural; no evidence of wildland threat